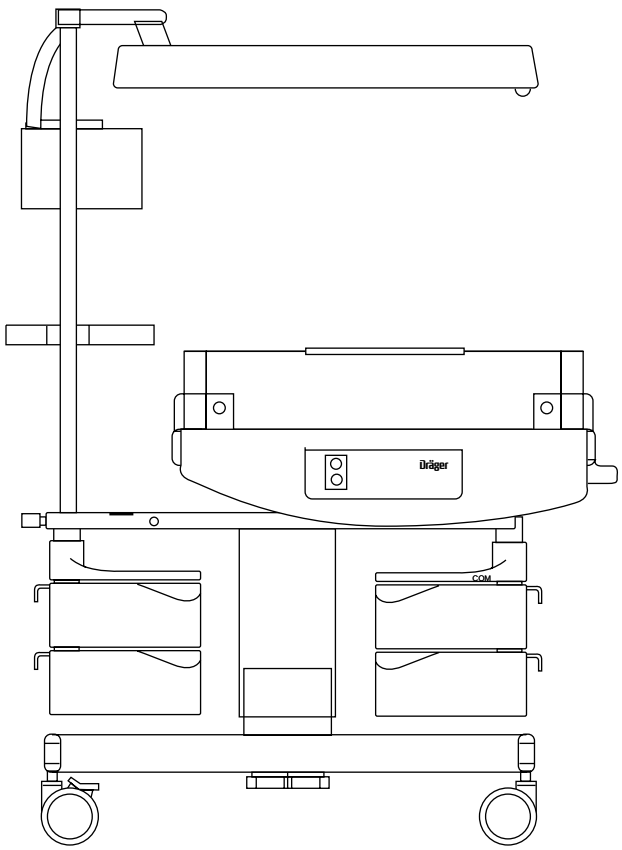
Babytherm 8004/8010

Technical
Documentation



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This technical documentation does not replace the Operating Manual.

The warranty and liability conditions of the general terms and conditions for business transactions of Dräger Medical AG & Co. KGaA are not extended by this technical documentation.

Safety Regulations:
Reference is hereby made to the observance of the relevant safety provisions, such as the Medical Equipment Ordinance (Medizingeräteverordnung), the Pressure Container Ordinance (Druckbehälterverordnung), the Technical Rules for Pressurised Gases (Technische Regeln Druckgase) or the Occupational Health and Safety Provisions (Unfallverhütungsvorschriften).

Insofar as reference is made to laws, regulations or standards, these are based on the legal system of the Federal Republic of Germany.

Follow your local laws and regulations.

Contents

General

1 Symbols and Definitions 5

Functional Description

1 Babytherm 8004 7

1.1 Radiant Heater 10

1.2 Control Unit 12

1.3 Panel 30

2 Babytherm 8010 37

2.1 Radiant Heater 41

2.2 Control Unit 43

2.3 Panel 63

3 Trolley 70

3.1 Electric Height Adjustment (Optional) 70

3.2 Options (for Retrofitting) 70

4 Resting Surface 71

4.1 X-ray drawer (Babytherm 8004) 73

5 Mattress 74

5.1 Gel Mattress 74

6 Pneumatics (Suction) 75

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Contents

Test List

1 Test Equipment 77

2 Accompanying Documents (applies only to Germany) 77

3 General Condition 77

3.1 Trolley without Electrical Height Adjustment 77

3.2 Trolley with Electrical Height Adjustment (optional) 77

3.3 Control Unit 78

3.4 Radiant Heater 78

3.5 Resting Surface 78

3.6 Base Plate 79

3.7 Foam Mattress (Babytherm 8004) 79

3.8 Gel Mattress (Babytherm 8010) 79

3.9 Swivel Cabinet (optional) 79

3.10 Hook Rail (optional) 79

3.11 Side Handle on Resting Surface (optional) 79

3.12 Hood (optional) 79

4 Tests as per VDE 0751 Part 1 (follow to local legislation, standards and regulations) 80

4.1 Checking the Protective Conductor Resistance 80

4.2 Checking the Equivalent Leakage Current 81

4.3 Checking the Patient Leakage Current 82

5 Functional Tests 83

5.1 Checking the LEDs, the LED Strip and the Buzzer in the Control Unit as well as Central Alarm Lamp in the Radiant Heater 83

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Contents

6 Place fully functional unit at customer's disposal. 85

7 Tested 85

Replacing Non-repairable Items

1 Work Light 86

1.1 General Information about the Work Light 86

1.2 Dismounting/Replacing the Work Light 86

2 Night Light 88

2.1 General Information about the Night Light 88

2.2 Dismounting/Replacing the Night Light 88

3 Phototherapy (Option) 90

3.1 General Information about the Phototherapy Lamps 90

3.2 Checking the Phototherapy Lamps 90

3.3 Dismounting/Replacing the Phototherapy Lamps 91

Changes

1 Type of Change 95

Appendix

1 Abbreviations 96

2 Spare parts list 97

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General

This Service Manual conforms to the International Standard IEC 60601-1.

Read each step in every procedure thoroughly before beginning any test. Always use the proper tools and specified test equipment. If you deviate from the instructions and/or recommendations in this Service Manual, the equipment may operate improperly or unsafely, or the equipment could be damaged.

Use only original Dräger parts and supplies.

The maintenance procedures described in this Service Manual may be performed by qualified service personnel only. These maintenance procedures do not replace inspections and servicing by Dräger Medical AG & Co. KGaA.

Strictly follow the Instructions for Use.

This Service Manual does not replace the Instructions for Use. Any use of the product requires full understanding and strict observation of the product-specific Instructions for Use.

Unless otherwise stated, reference is made to laws, regulations or standards (as amended) applicable in the Federal Republic of Germany.

1 Symbols and Definitions

– A dash (–) is used to identify items on a list.

– A bullet (•) is used to identify a sentence that contains direct work instructions.

This symbol is used to provide important information that, if ignored, could lead directly to a patient's or operator's injury. It is also used to provide important information that, if ignored, could lead directly to equipment damage and, indirectly, to a patient's injury.

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This symbol is used to provide additional information, operating tips, or maintenance suggestions.

Definitions according to German standard DIN 31051:

Inspection	=	examination of actual condition
Servicing	=	measures to maintain specified condition
Repair	=	measures to restore specified condition
Maintenance	=	inspection, servicing, and repair

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1 Babytherm 8004

The Babytherm 8004 is an open incubator for keeping premature babies and infants with a body weight of up to 8 kg warm.

The Babytherm 8004 provides warmth by a radiant heater in “manual mode “ with automatic “skin temperature control”.

The Babytherm 8004 is used in the delivery room, the neonatal ward, the children’s ward and the children’s intensive care unit. The Babytherm 8004 is operated by a doctor, or by nurses or orderlies under the supervision of a doctor.

Danger of burns! Infants who are in shock have a markedly lower than normal skin temperature, and would be overexposed if skin temperature regulation were used. **Do not use skin temperature regulation for infants who are in shock!**

Danger of hypothermia! Infants who have a fever have a markedly higher than normal skin temperature, and would experience hypothermia if skin temperature regulation were used. **Do not use skin temperature regulation for infants who have a fever!**

Incorrect measurements! If the skin temperature sensor is used rectally in the skin temperature regulation operating mode, the core temperature is measured and regulated. **Do not use the skin temperature sensor rectally!**

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The Babytherm 8004 includes a radiant heater, a control unit, a resting surface and a trolley.

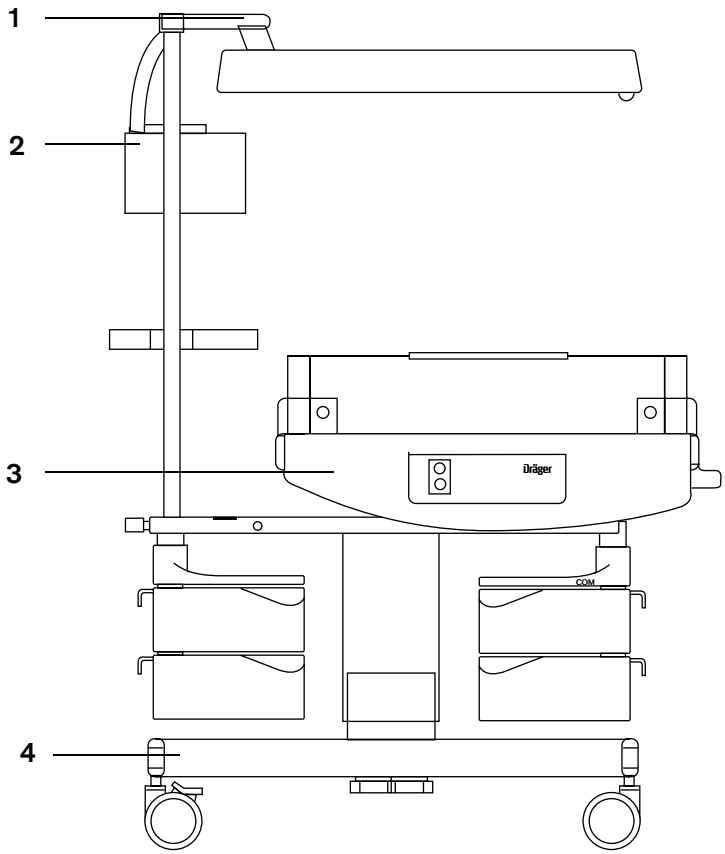

Fig. 1: Front view of the Babytherm 8004

Legend

Table 1:

1	Radiant heater
2	Control unit
3	Resting surface
4	Trolley without electric height adjustment Trolley with electric height adjustment (optional)

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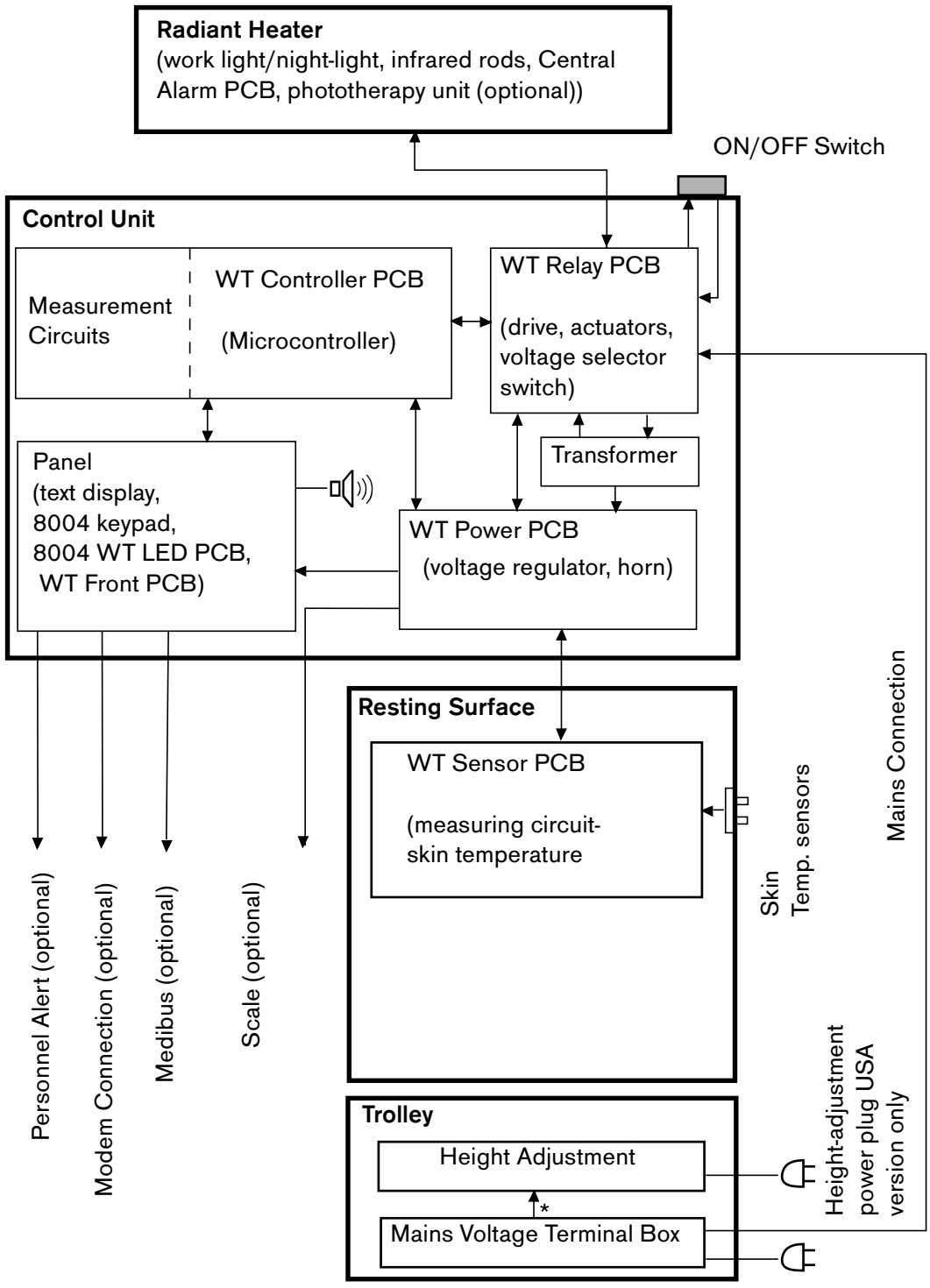

Fig. 2: Block diagram of the Babytherm 8004

* The connection between the mains voltage terminal box and the height-adjustment is not available in the USA version.

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1.1 Radiant Heater

The radiant heater emits a pre-set amount of heat. A multi-conductor cable connects the radiant heater to the control unit.

The radiant heater contains the following subassemblies:

- Two infrared rods (600 W overall power)
- Energy-saving lamp (7 W)
- Energy-saving lamp (23 W)
- Central Alarm PCB
- Six halogen lamps (50 W) for phototherapy unit (optional)
- Switched-Mode Power Supply PCB for phototherapy unit (optional).

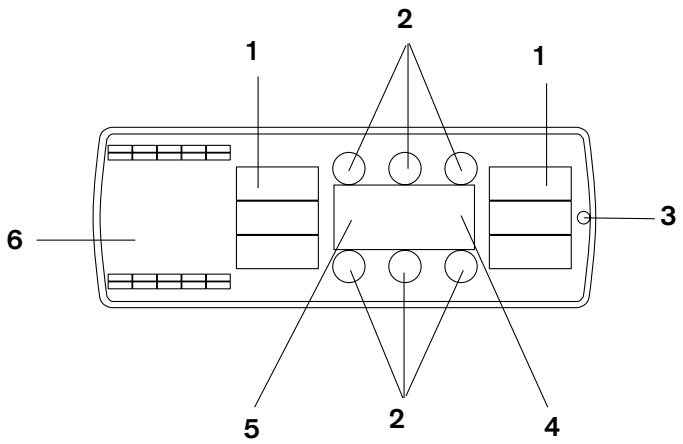

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Fig. 3: bottom view of radiant heater

Legend

Table 2:

1	Infrared rod
2	Halogen lamps for phototherapy unit (optional)
3	Central Alarm PCB
4	Energy-saving lamp no. 1
5	Energy-saving lamp no. 2
6	Switched-Mode Power Supply PCB for phototherapy unit (optional)

When the button for the work light is pressed, both energy-saving lamps (energy-saving lamp no. 1 and energy-saving lamp no. 2) are switched on.

When the night-light button is pressed, only energy-saving lamp no. 1 is switched on.

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1.2 Control Unit

The control unit controls and regulates the functions of the Babytherm 8004.

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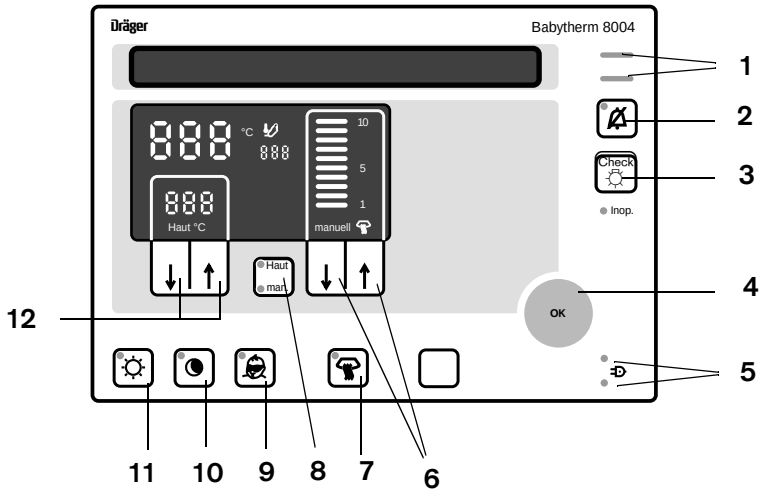

Fig. 4: Front view of the control unit of Babytherm 8004

Legend

Table 3:

1	Alarm LED (red alarm LED = warning, yellow alarm LED = caution)
2	Reset key (silence key) (15 minute alarm/10 minute alarm)
3	Check key (test LEDs and audible alarm)
4	OK key
5	LEDs (green LED = operating mode, red LED = powerfail)
6	Heat level adjustment for radiant heater
7	Radiant heater ON/OFF switch
8	Skin/manual key (selector switch: manual power adjustment/skin temperature regulation)
9	Phototherapy unit ON/OFF switch (optional)
10	Night-light ON/OFF switch (energy-saving lamp no. 1)
11	Work light ON/OFF switch (energy-saving lamp no. 1 and energy-saving lamp no. 2)
12	Skin temperature regulation target value adjustment

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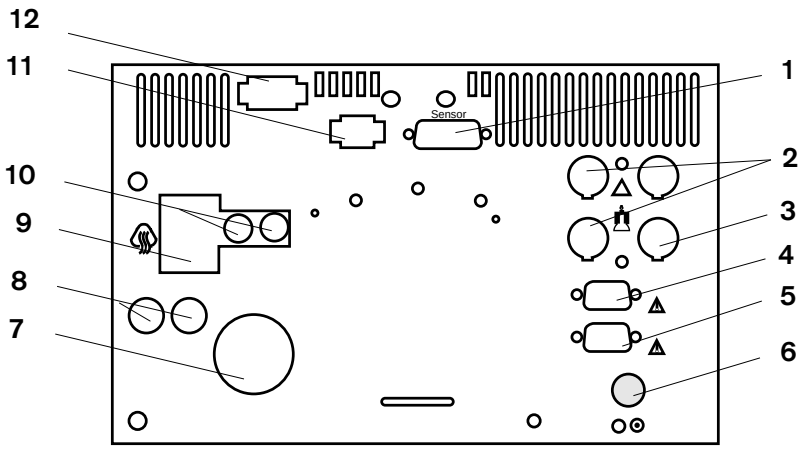

Fig. 5: Rear view of the control unit 8004

Legend

Table 4:

1	Connection for WT Sensor PCB
2	Connections for personnel alert; max. 3 devices of workplace (connections for central alarm)
3	Connection for public address system, personnel alert (connection for central alarm)
4	RS 232 interface (modem), optional
5	RS 232 interface (BabyLink), optional
6	Control unit ON/OFF switch
7	Voltage Selector Switch
8	Fuses
9	Connection for radiant heater
10	Fuses
11	Connection for mattress heater
12	Connection for mains power supply

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The control unit consists of the following subassemblies:

- ON/OFF switch
- Toroidal-core power transformer
- WT Power PCB
- WT Relay PCB
- WT Controller PCB
- Panel (8004 WT LED PCB, 8004 keypad, text display, WT Front PCB, loudspeaker).

1.2.1 ON/OFF Switch

The single pole ON/OFF switch switches the mains voltage on or off.

1.2.2 Toroidal-Core Power Transformer

The toroidal-core power transformer supplies the electronics and the mattress heater with the following alternating voltages:

- approximately 24 VAC
- approximately 9 VAC.

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1.2.3 WT Power PCB

The WT Power PCB consists of the following functional modules:

- Bridge rectifier
- Voltage regulator (+5 VD)
- Voltage regulator (+5 VLED)
- GoldCap
- Charging circuit (GoldCap)
- Mains voltage power failure recognition
- Horn (mains voltage failure)
- Alarm LED drive (mains voltage failure)
- Serial data transmission
- Multiplexer
- Addressing and drive for actuators and safety relays.

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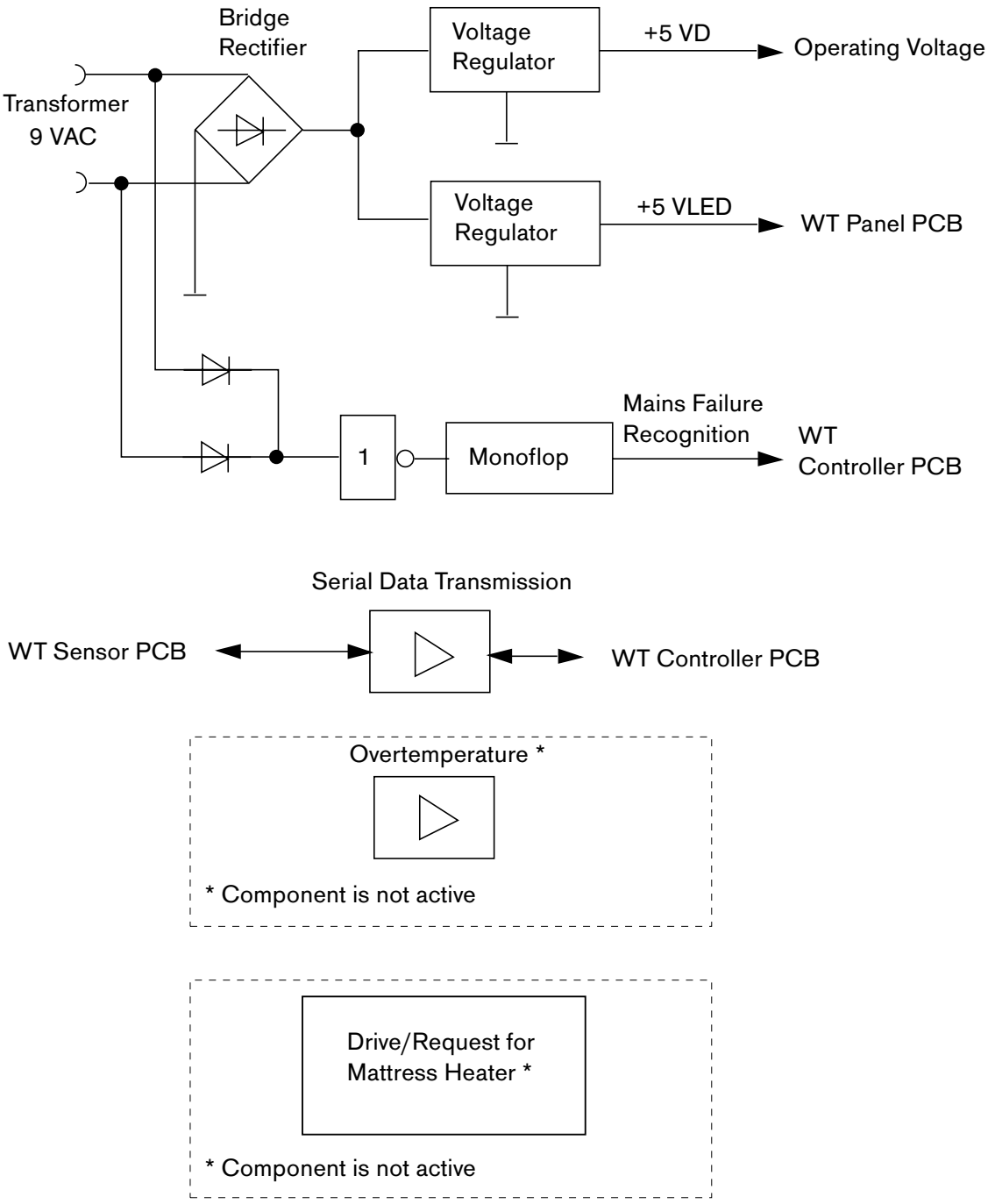

Fig. 6: Block diagram 1 of WT Power PCB

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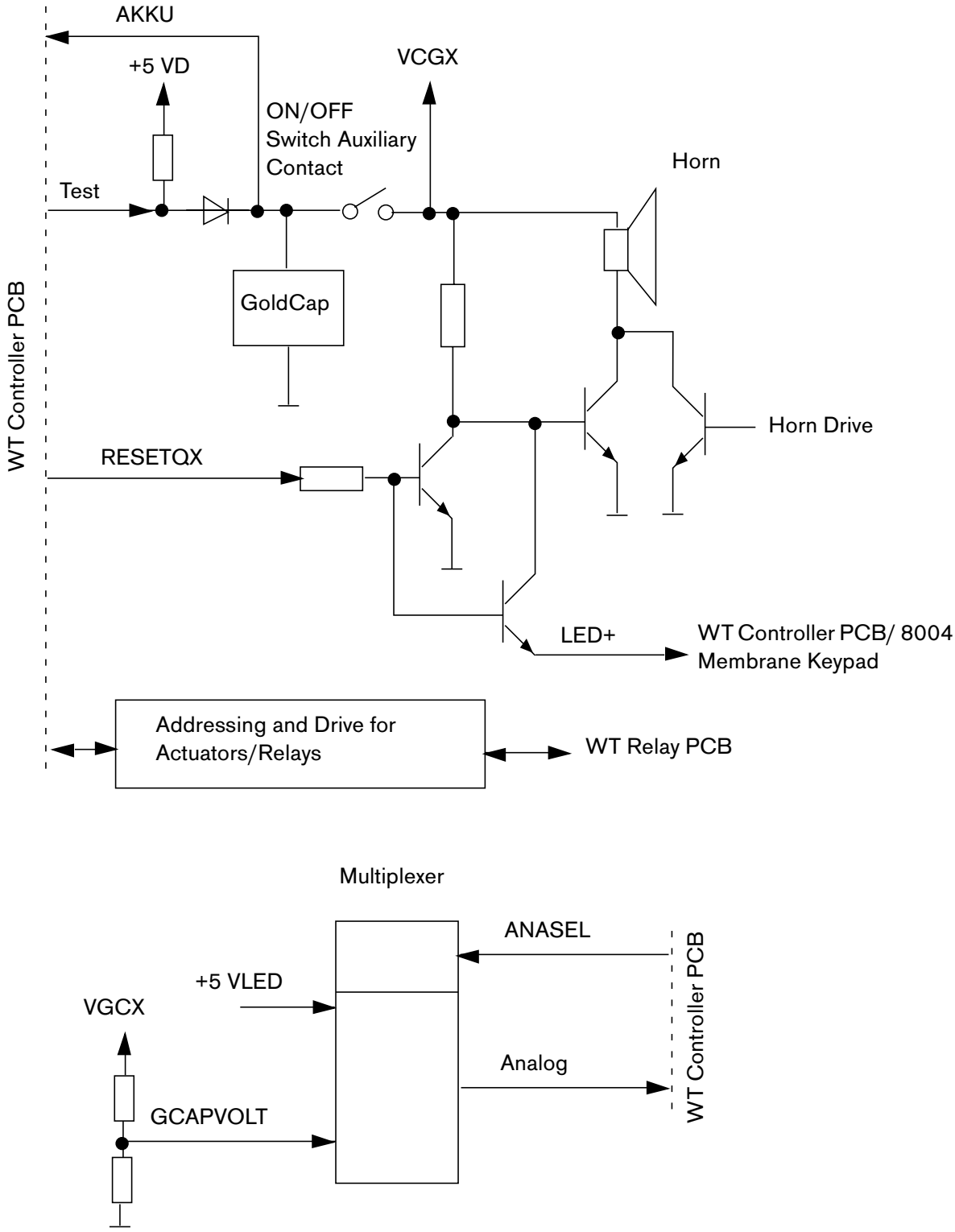

Fig. 7: Block diagram 2 of WT PCB Power Supply

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Bridge Rectifier

The toroidal-core power transformer applies approximately 10 VAC to the bridge rectifier input from which an uncontrolled direct voltage of approximately 9 VDC is generated.

Voltage Regulator (+5 VD)

The controlled operating voltage +5 VD is generated from the uncontrolled 9 V direct voltage by a voltage regulator.

Voltage Regulator (+5 VLED)

The controlled operating voltage +5 VLED is generated from the uncontrolled 9 V direct voltage by a voltage regulator.

GoldCap

The GoldCap supplies the horn and the mains failure LED with operating voltage in the event of mains voltage failure. The GoldCap voltage accumulator also buffers microcontroller RAM.

Charging Circuit (GoldCap)

The internal + 5VD operating voltage charges via a resistor-diode circuit the GoldCap. The charging circuit is switched off once per second for testing purposes.

Mains Voltage Power Failure Recognition

A monoflop recognises a failure of the mains voltage supply.

Horn (Mains Voltage Failure)

A GoldCap provides for horn operating voltage in the event of a mains voltage failure.

Alarm LED Drive (Mains Voltage Failure)

A GoldCap provides for alarm LED operating voltage in the event of a mains voltage failure.

Serial Data Transmission

A driver module amplifies serial measurement data of the skin temperature, test signals and control signals.

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Multiplexer

The multiplexer switches the voltages (GCAPVOLT, +5 VLED) to the WT Controller PCB for testing.

Addressing and Drive for Actuators and Relays

An addressing module, a shift register and an amplification module call up the actuators and the safety relay for the radiant heater.

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1.2.4 WT Relay PCB

The energy-saving lamps, the infrared rods, the Central Alarm PCB and the radiant heater phototherapy unit (optional) are driven by relays located on the WT Relay PCB. A triac controls the infrared rods.

The WT Relay PCB contain the following subassemblies:

- Voltage selector switch
- Infrared rods drive/feedback
- Infrared rod safety relay
- Relays (energy-saving lamps, phototherapy unit (optional))
- Drive for Central Alarm PCB.

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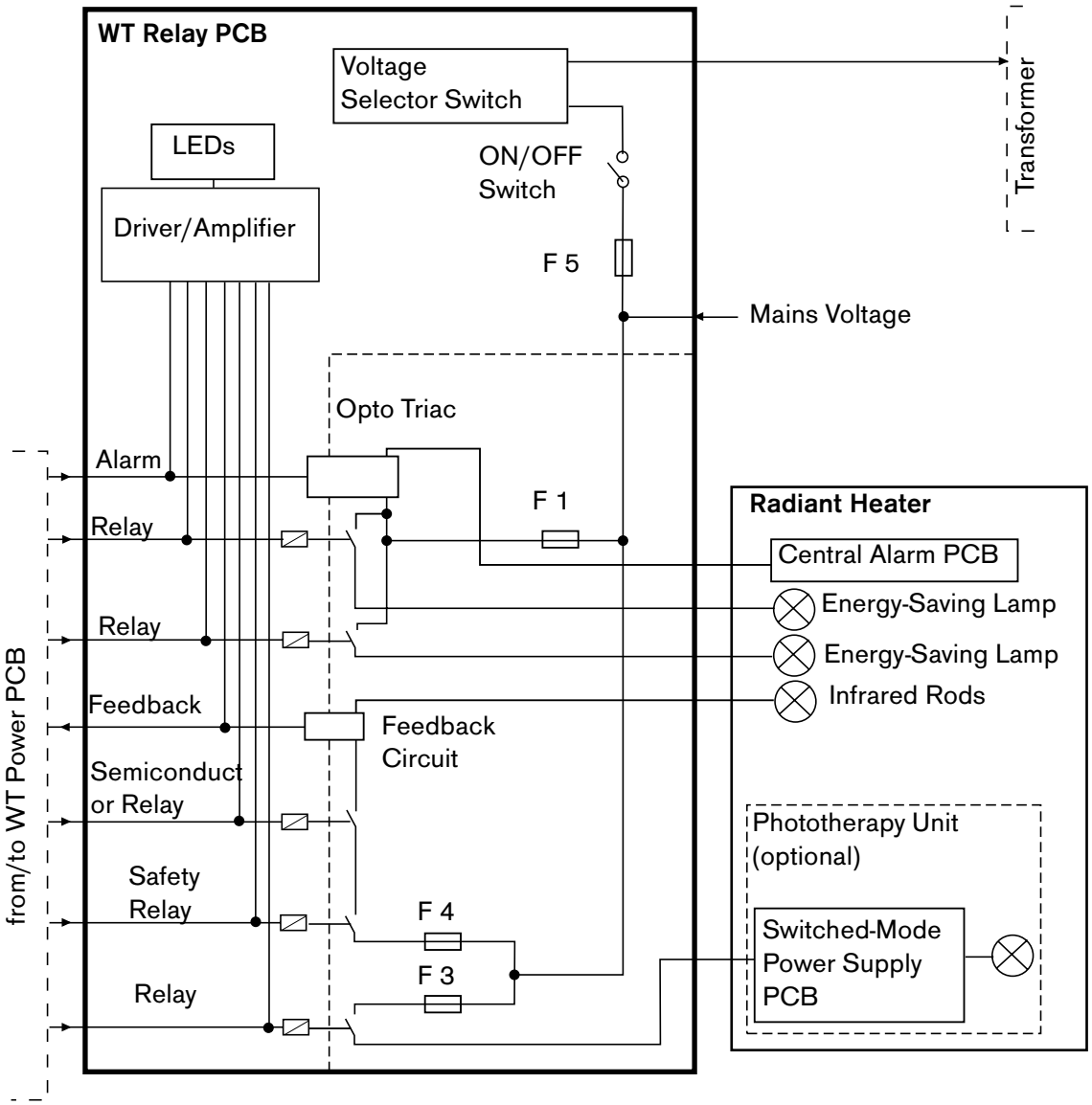

Fig. 8: Block Diagram of WT Relay PCB

Voltage Selector Switch

The voltage selector switch allows for adapting the primary circuit of the toroidal-core power transformer to the local mains voltage.

Radiant Heater Drive/Feedback

An optocoupler drives the triac, which supplies the infrared rods with mains voltage. The voltage of the infrared rods generates an acknowledgement signal with an optocoupler.

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Infrared Rod Safety Relay

The safety relay interrupts mains voltage to the infrared rods in the event of an error (e.g. “Inop”).

Relays (Energy-Saving Lamps, Phototherapy Unit (optional))

The relays supply the energy-saving lamps and the phototherapy unit (optional) with mains voltage.

Drive for Central Alarm PCB

An opto triac at the WT Relay PCB drives the central alarm lamp. The opto triac supplies the Central Alarm PCB with mains voltage.

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1.2.5 WT Controller PCB

The WT Controller PCB contains the following subassemblies:

- Microcontroller
- Quartz element
- EPROM
- EEPROM
- RAM
- Watchdogs
- Driver elements
- Multiplexer and A-D converter.

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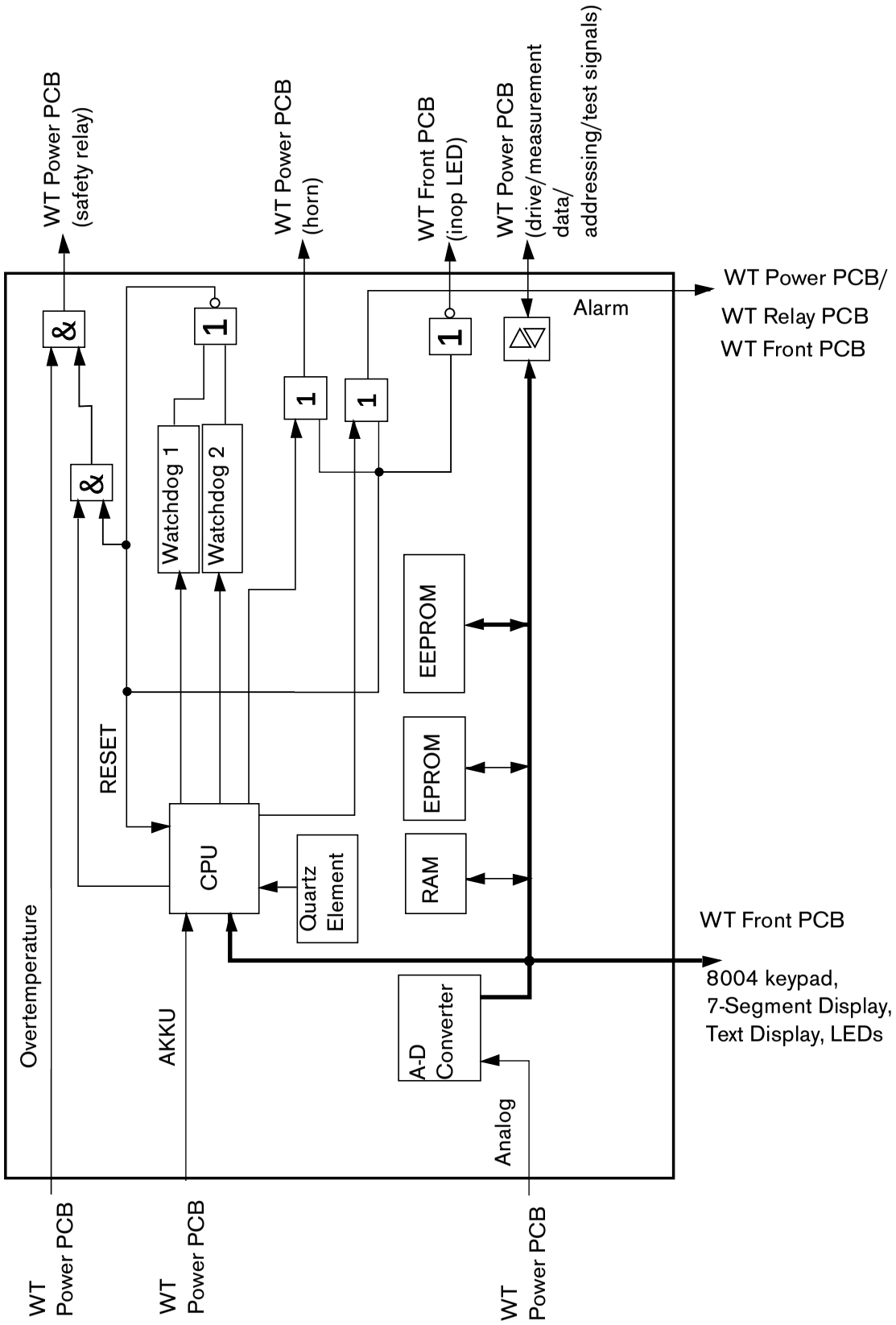

Fig. 9: Block Diagram of WT Controller PCB

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Microcontroller

The microcontroller controls and monitors the Babytherm program. The microcontroller contains 2 KB RAM. Target values are stored and buffered in this RAM. An accumulator RAM buffer voltage is generated by the GoldCap.

Quartz Element

The quartz element generates a pulse frequency of approximately 32 MHz. The microcontroller generates a frequency of 16 MHz with this pulse frequency.

EPROM

The EPROM contains the Babytherm software program.

EEPROM

The EEPROM stores device configuration data.

RAM

The RAM is the main memory.

Watchdogs

The watchdogs monitor the software program sequence of the microcontroller. The watchdogs are counting elements, which are timed with a separate quartz element.

If the microcontroller does not reset the counting elements, an EMERGENCY STOP signal is generated.

Driver Elements

The driver elements amplify the signals and adjust their levels for the actuator driver.

Multiplexer and A-D Converter

The A-D Converter converts the +5 VLED voltage and the GoldCap voltage into a digital data word. This data word is sent to the microcontroller for the purpose of evaluation.

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1.2.6 WT Sensor PCB

The WT Sensor PCB includes the following subassemblies:

- Receiver and sender for serial data transmission
- Test signal select logic
- Measurements amplifiers of skin temperature
- Test circuit (36.0 °C - skin temperature)
- A-D conversion with multiplexer.

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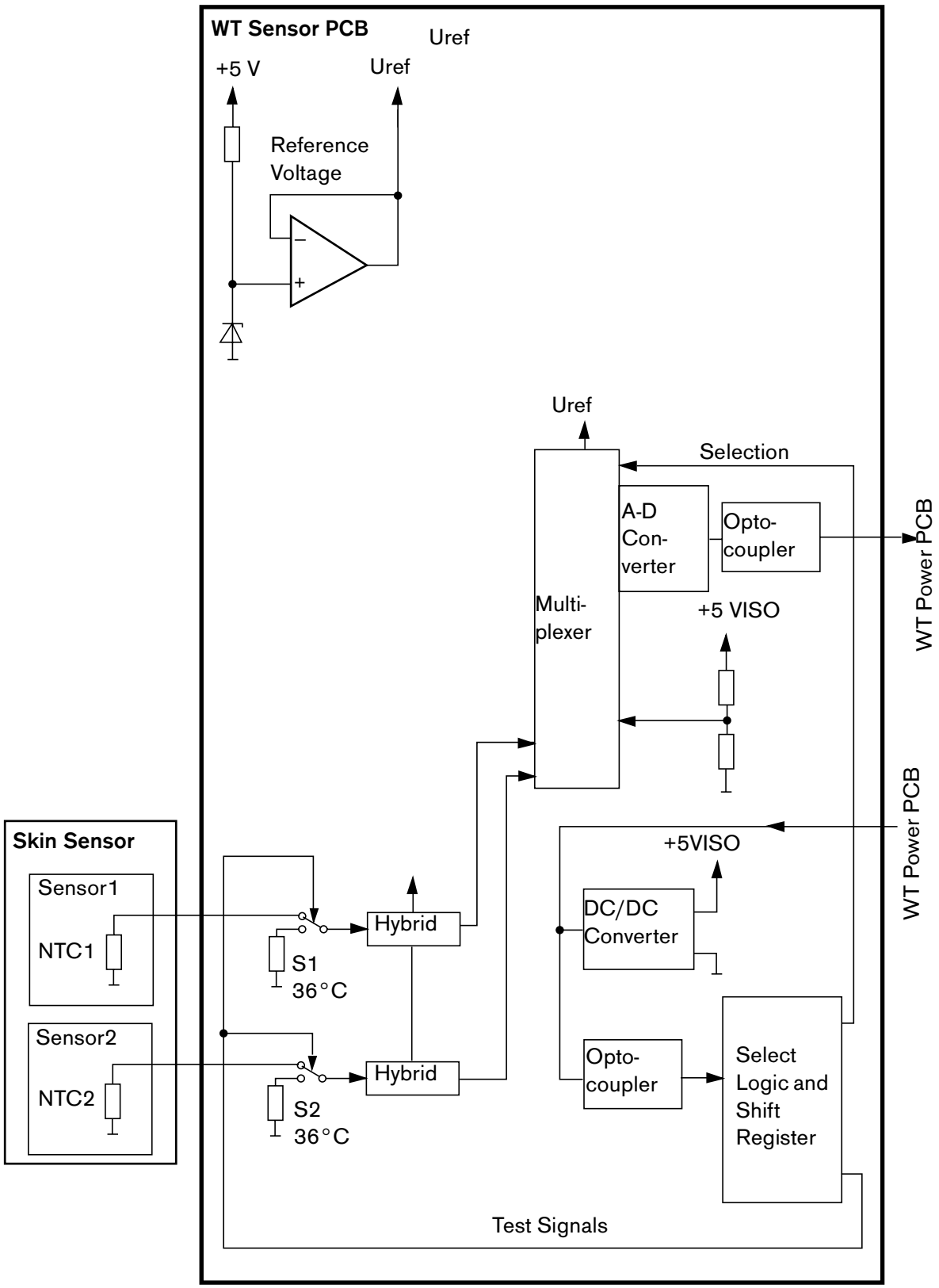

Fig. 10: Block diagram of WT Sensor PCB

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Receiver and Sender for Serial Data Transmission

Optocouplers transmit the serial measurement data of skin temperature and the WT Sensor PCB operating voltage to the WT Power PCB. One optocoupler receives the test signals in serial mode for the measurement circuits.

Test Signal Select Logic

An addressing module and a shift register convert the serial test signals into parallel data.

The test signals activate the skin temperature 36 °C test circuit.

Measurement Amplifier of the Skin Temperature

Two skin temperature hybrids measure the skin temperature.

Test Circuit (36.0 °C - Skin Temperature)

The software monitors the skin temperature hybrid.

Reference resistors, which are linked to the test circuits, are connected to the inputs of the skin temperature hybrids. The output voltage values of the skin temperature hybrids correspond to a temperature of 36.0 °C.

A-D Conversion with Multiplexer

The multiplexer sends an analog measurement signal of skin temperature to the integrated A-D converter. The serial output signal from the A-D converter is connected to an optocoupler.

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1.3 Panel

The panel consists of the following subassemblies:

- 8004 WT LED PCB
- 8004 keypad
- Text display
- WT Front PCB
- Loudspeaker.

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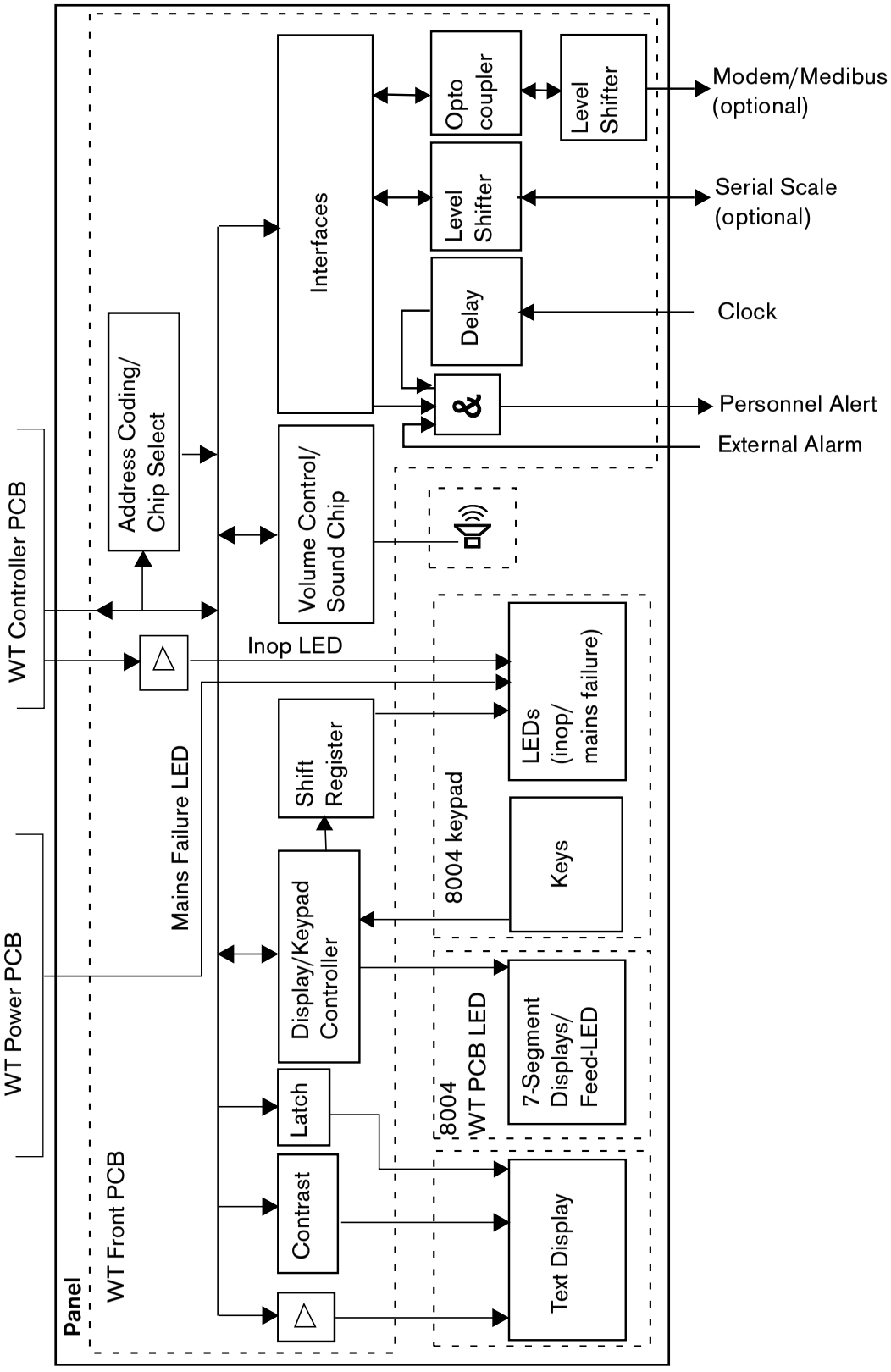

Fig. 11: Block diagram of the Panel

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1.3.1 8004 WT LED PCB

The 8004 WT LED PCB contains 7-segment displays to represent the skin temperature and a light emitting diode for display the feed symbol.

1.3.2 8004 Keypad

The 8004 keypad includes a key array, keys and LEDs.

1.3.3 Text Display (LC display)

The text display shows clear text messages (comments, warnings, alarms and commands).

1.3.4 Loudspeaker

Acoustic alarms are generated at the loudspeaker for alarms and comments. A volume control and a sound chip control the loudspeaker.

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1.3.5 WT Front PCB

A port component reads in the key array. LED drive is accomplished with decoders, shift registers and multiplex signals.

The WT Front PCB contains the following subassemblies:

- Address coding and chip select
- Sound chip with volume regulator
- Text display contrast adjustment
- Text display latch drive
- Voltage supply for text display backlighting
- Personnel alert
- Interface modules
- Level shifters
- Optocouplers
- Display module
- LED matrix drive.

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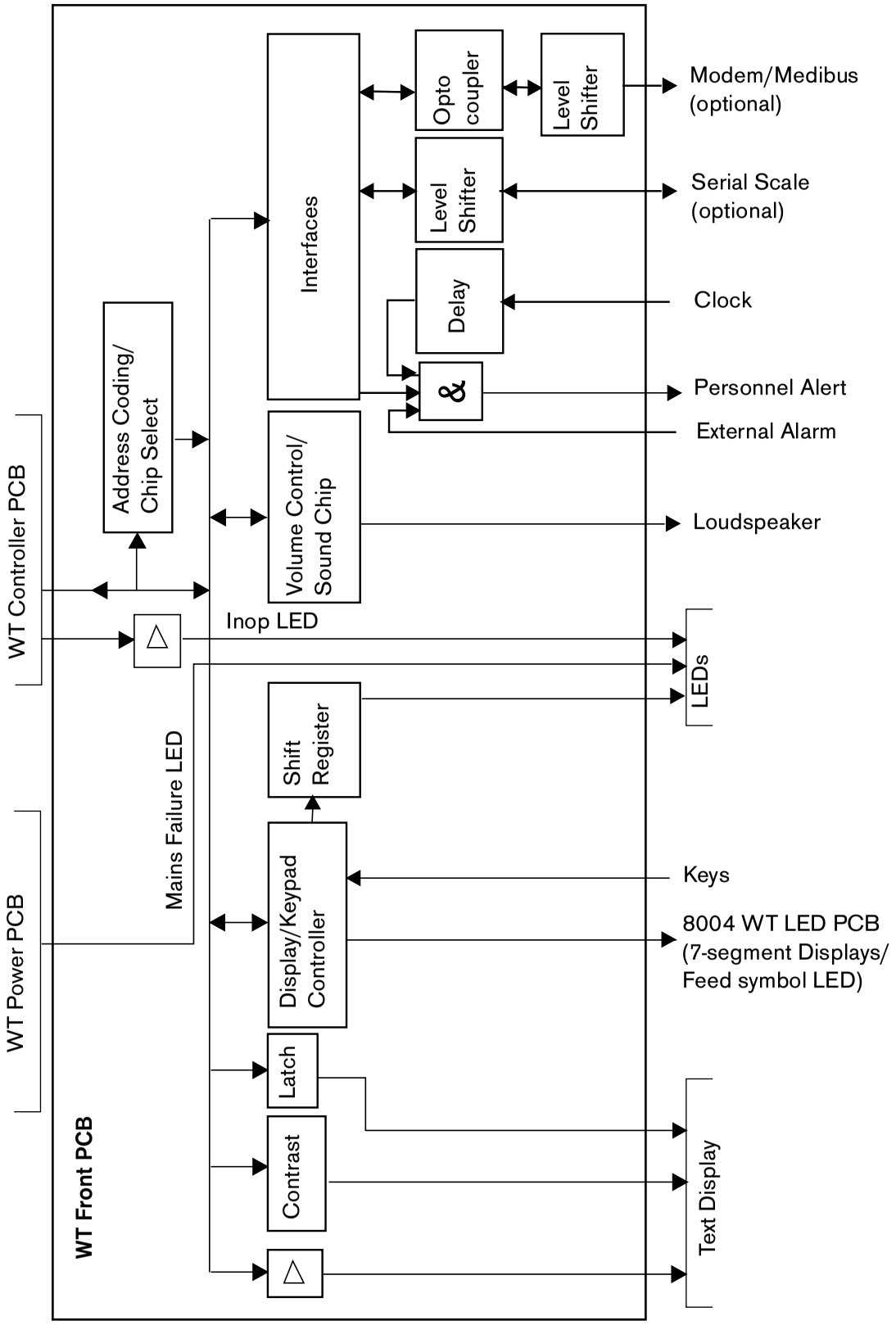

Fig. 12: Block Diagram of the WT Front PCB

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Address Coding and Chip Select

Addressing and selection modules select the various hardware components.

Sound Chip with Volume Regulator

The microcontroller links the output signal of the sound chip to the output signal of the volume regulator. The combined signal is amplified and fed to the loudspeaker.

The microcontroller can influence the volume of the volume regulator via software.

Text Display Contrast Adjustment

An amplifier module enables contrast adjustment at the text display.

Text Display Latch Drive

Latch modules drive the text display signal.

Voltage Supply for Text Display Illumination

A switching controller supplies the text display backlighting foil with a voltage of approximately 1.0 V to 5.0 V.

Personnel Alert

In the event of an alarm a relay is activated. The relay functions as a selector switch. An external alarm system can be connected to the selector switch (e.g. personnel alert).

An alarm delay prevents the personnel alert from being immediately activated after the Check key has been actuated.

Interface Modules

The interface modules link the data bus to the peripheral units (medibus, modem, scale).

Level Shifters

The level shifters adapt the WT Front PCB interface to the peripheral devices interfaces.

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Optocouplers

Optocouplers isolate the modem, the medibus and the central alarm from the WT Front PCB.

Display Module

The display module provides the 7-segment display with operating voltage. The display module selects the individual keys. The display module stores the actuated key in an storage area, and sends this as information to the data bus.

LED Matrix Drive

A shift register and select logic drive the LED matrix.

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2 Babytherm 8010

The Babytherm 8010 is an open incubator for keeping premature babies and infants with a body weight of up to 8 kg warm.

The Babytherm 8010 provides warmth by a radiant heater in “manual mode “ with automatic “skin temperature control”. It also has a heated gel mattress.

The Babytherm 8010 is used in the delivery room, the neonatal ward, the children’s ward and the children’s intensive care unit. The Babytherm 8010 is operated by a doctor, or by nurses or orderlies under the supervision of a doctor.

Danger of burns! Infants who are in shock have a markedly lower than normal skin temperature, and would be overexposed if skin temperature regulation were used. **Do not use skin temperature regulation for infants who are in shock!**

Danger of hypothermia! Infants who have a fever have a markedly higher than normal skin temperature, and would experience hypothermia if skin temperature regulation were used. **Do not use skin temperature regulation for infants who have a fever!**

Incorrect measurements! If the skin temperature sensor is used rectally in the skin temperature regulation operating mode, the core temperature is measured and regulated. **Do not use the skin temperature sensor rectally!**

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The Babytherm 8010 includes a radiant heater, a control unit, a resting surface and a trolley.

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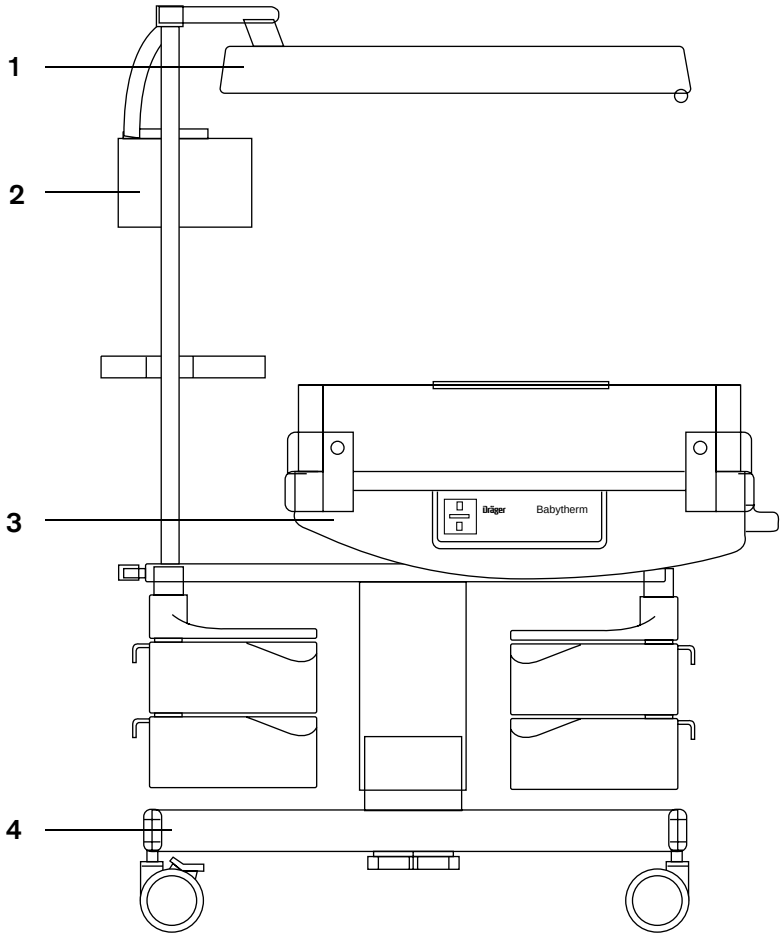

Fig. 13: Front view of the Babytherm 8010

Legend

Table 5:

1	Radiant heater
2	Control unit
3	Resting surface
4	Trolley without electric height adjustment Trolley with electric height adjustment (optional)

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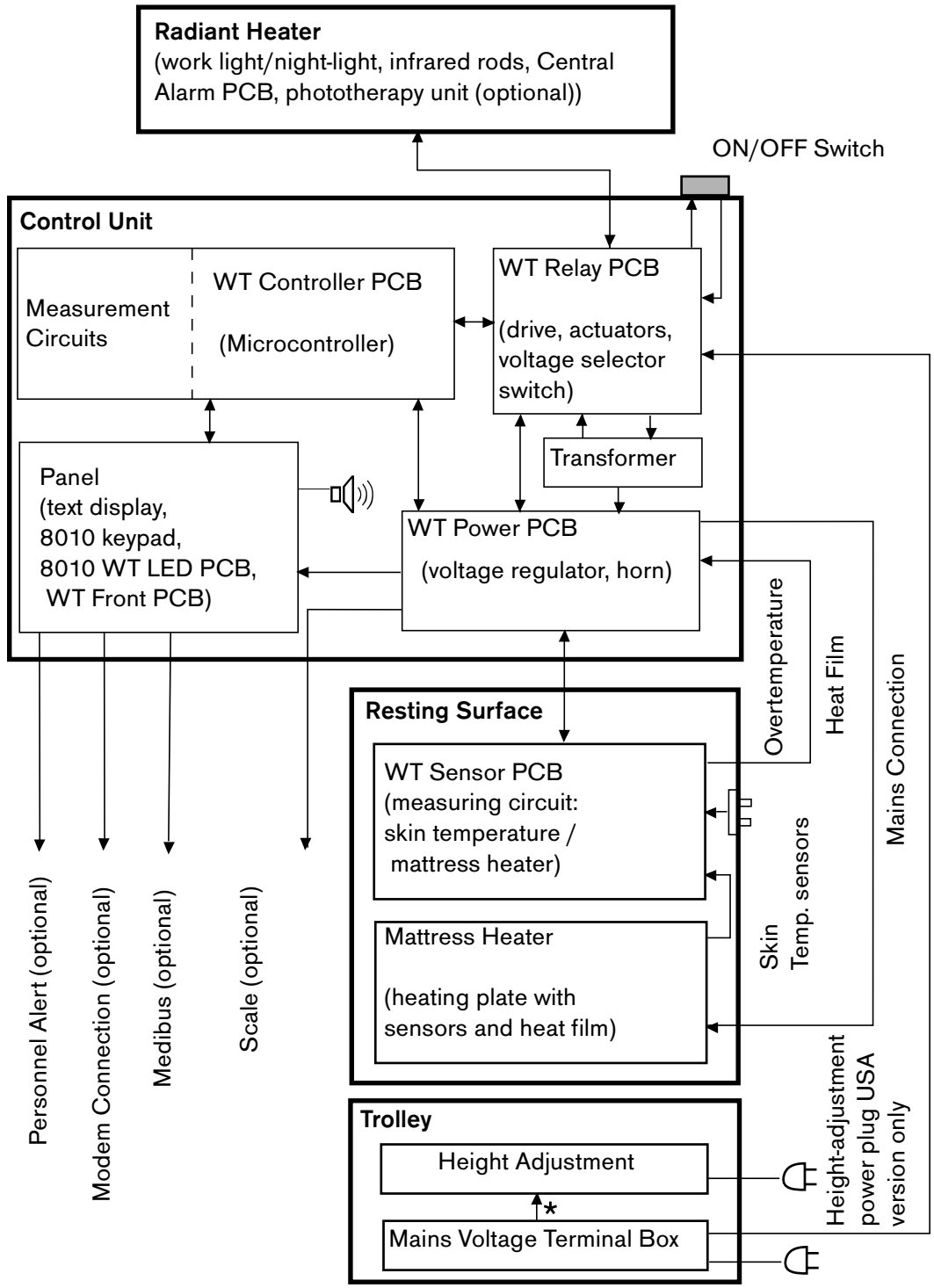

Fig. 14: Block diagram of the Babytherm 8010

* The connection between the mains voltage terminal box and the height adjustment is not available in the USA version.

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2.1 Radiant Heater

The radiant heater emits a pre-set amount of heat. A multi-conductor cable connects the radiant heater to the control unit.

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The radiant heater contains the following subassemblies:

- Two infrared rods (600 W overall power)
- Energy-saving lamp (7 W)
- Energy-saving lamp (23 W)
- Central Alarm PCB
- Six halogen lamps (50 W) for phototherapy unit (optional)
- Switched-Mode Power Supply PCB for phototherapy unit (optional).

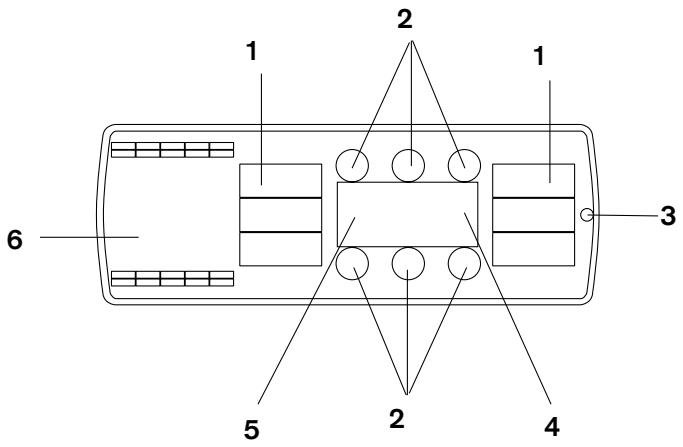

Fig. 15: bottom view of radiant heater

Legend

Table 6:

1	Infrared rod
2	Halogen lamps for phototherapy unit (optional)
3	Central Alarm PCB
4	Energy-saving lamp no. 1
5	Energy-saving lamp no. 2
6	Switched-Mode Power Supply PCB for phototherapy unit (optional)

When the button for the work light is pressed, both energy-saving lamps (energy-saving lamp no. 1 and energy-saving lamp no. 2) are switched on.

When the night-light button is pressed, only energy-saving lamp no. 1 is switched on.

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2.2 Control Unit

The control unit controls and regulates the functions of the Babytherm 8010.

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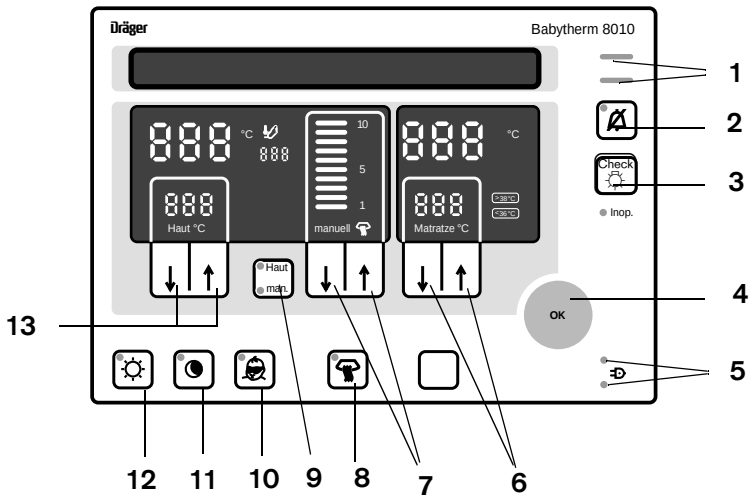

Fig. 16: Front view of the control unit of Babytherm 8010

Legend

Table 7:

1	Alarm LED (red alarm LED = warning, yellow alarm LED = caution)
2	Reset key (silence key) (15 minute alarm/10 minute alarm)
3	Check key (test LEDs and audible alarm)
4	OK key
5	LEDs (green LED = operating mode, red LED = powerfail)
6	Target value adjustment for mattress heater
7	Heat level adjustment for radiant heater
8	Radiant heater ON/OFF switch
9	Skin/manual key (selector switch: manual power adjustment/skin temperature regulation)
10	Phototherapy unit ON/OFF switch (optional)
11	Night-light ON/OFF switch (energy-saving lamp no. 1)
12	Work light ON/OFF switch (energy-saving lamp no. 1 and energy-saving lamp no. 2)
13	Skin temperature regulation target value adjustment

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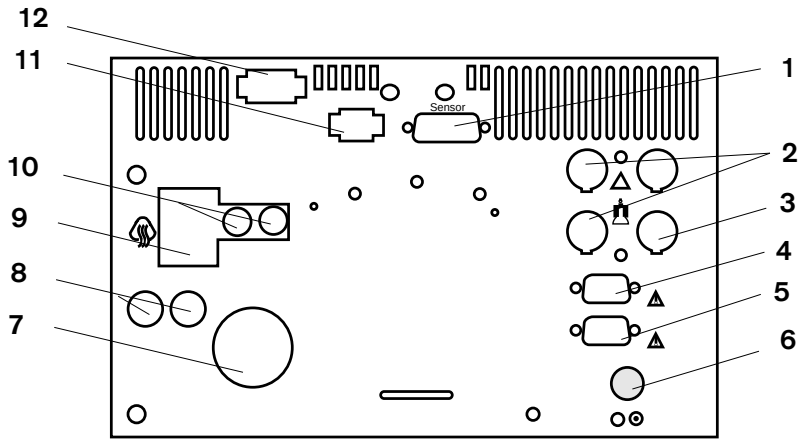

Fig. 17: Rear view of the control unit

Legend

Table 8:

1	Connection for WT Sensor PCB
2	Connections for personnel alert; max. 3 devices of workplace (connections for central alarm)
3	Connection for public address system, personnel alert (connection for central alarm)
4	RS 232 interface (modem), optional
5	RS 232 interface (BabyLink), optional
6	Control unit ON/OFF switch
7	Voltage Selector Switch
8	Fuses
9	Connection for radiant heater
10	Fuses
11	Connection for mattress heater
12	Connection for mains power supply

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The control unit consists of the following subassemblies:

- ON/OFF switch
- Toroidal-core power transformer
- WT Power PCB
- WT Relay PCB
- WT Controller PCB
- Panel (8010 WT LED PCB, 8010 keypad, text display, WT Front PCB, loudspeaker).

2.2.1 ON/OFF Switch

The single pole ON/OFF switch switches the mains voltage on or off.

2.2.2 Toroidal-Core Power Transformer

The toroidal-core power transformer supplies the electronics and the mattress heater with the following alternating voltages:

- approximately 24 VAC
- approximately 9 VAC.

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2.2.3 WT Power PCB

The WT Power PCB consists of the following functional modules:

- Bridge rectifier
- Voltage regulator (+5 VD)
- Voltage regulator (+5 VLED)
- GoldCap
- Charging circuit (GoldCap)
- Mains voltage power failure recognition
- Horn (mains voltage failure)
- Alarm LED drive (mains voltage failure)
- Serial data transmission
- Multiplexer
- Addressing and drive for actuators and safety relays
- Drive/request for mattress heater.

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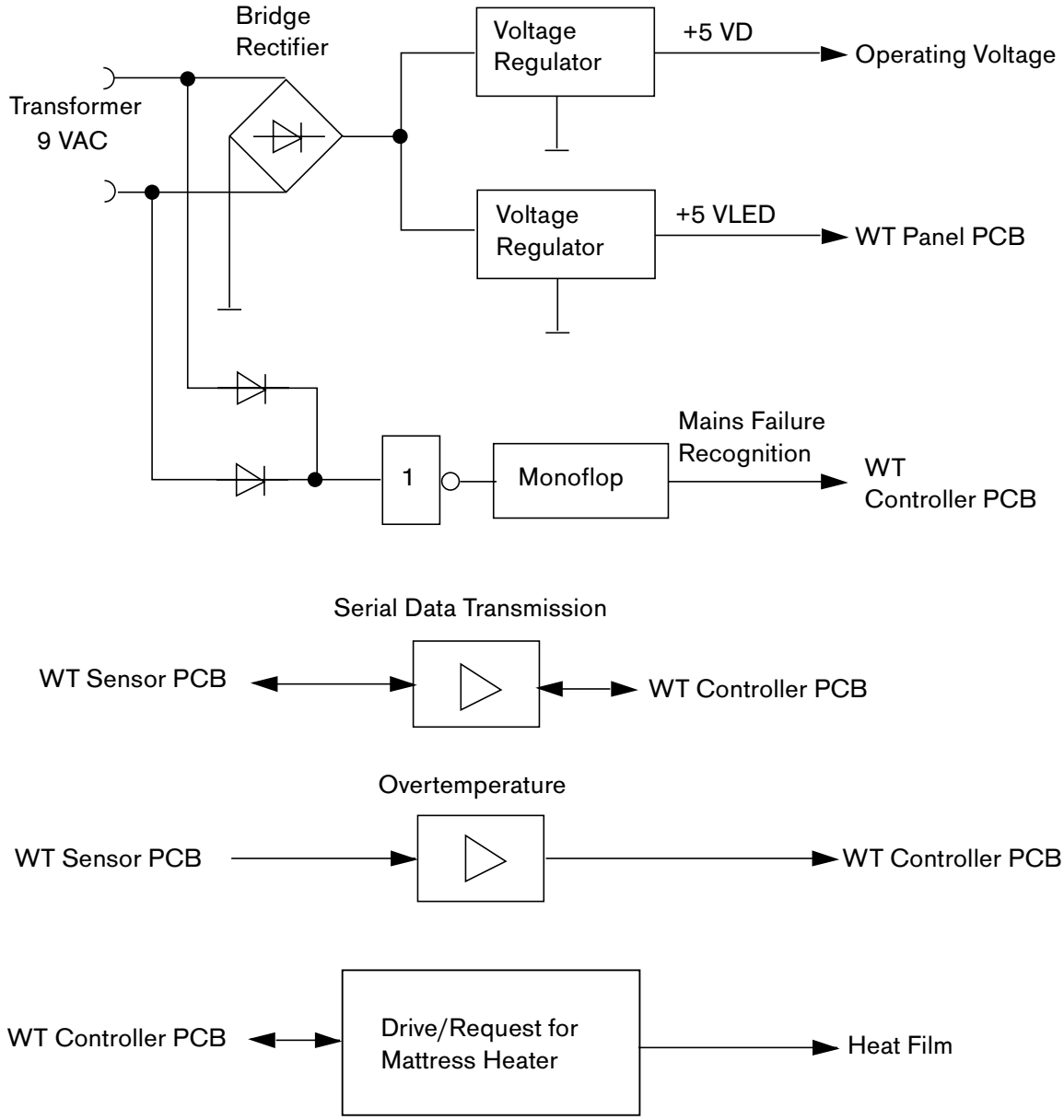

Fig. 18: Block diagram 1 of WT Power PCB

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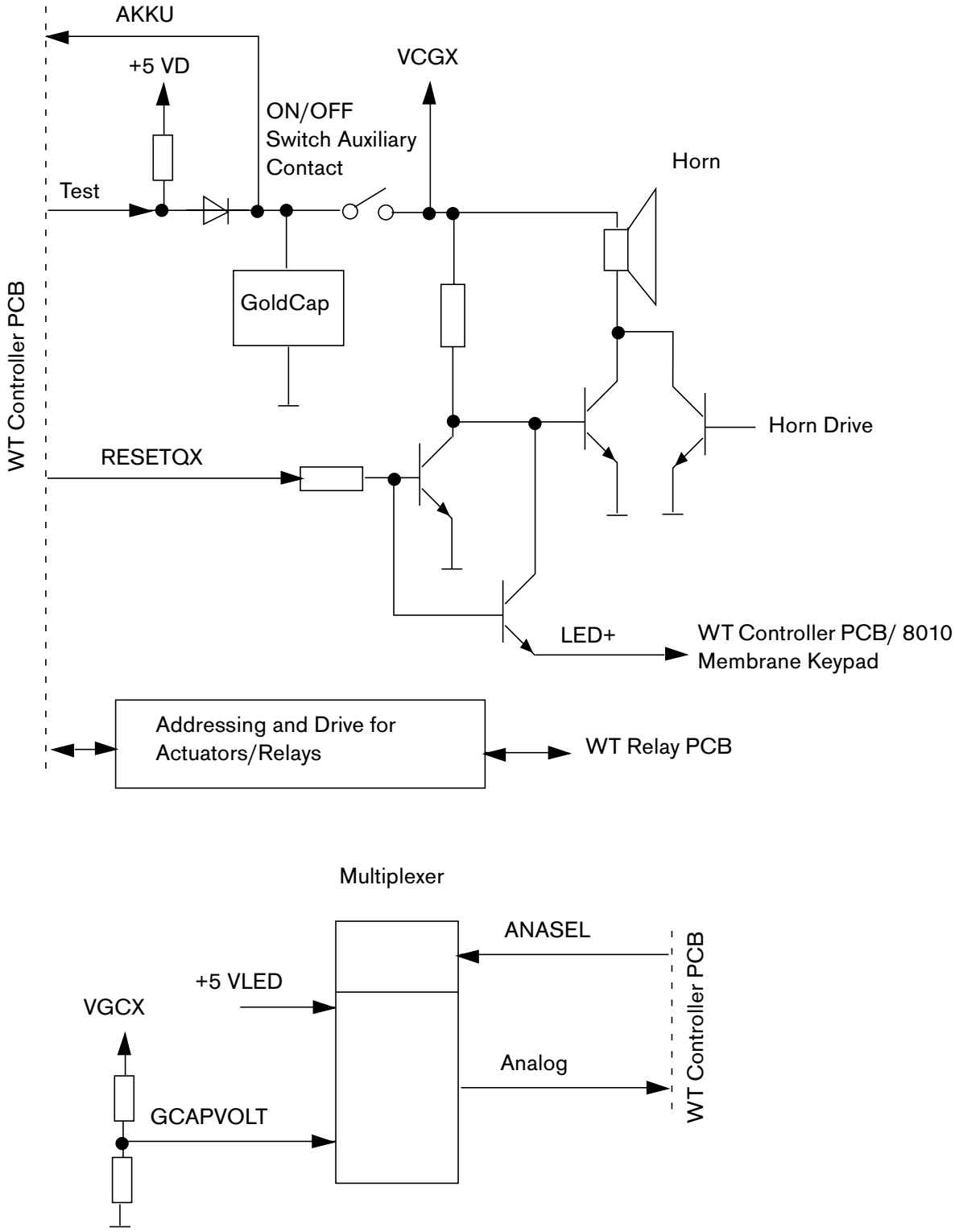

Fig. 19: Block diagram 2 of WT PCB Power Supply

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Bridge Rectifier

The toroidal-core power transformer applies approximately 10 VAC to the bridge rectifier input from which an uncontrolled direct voltage of approximately 9 VDC is generated.

Voltage Regulator (+5 VD)

The controlled operating voltage +5 VD is generated from the uncontrolled 9 V direct voltage by a voltage regulator.

Voltage Regulator (+5 VLED)

The controlled operating voltage +5 VLED is generated from the uncontrolled 9 V direct voltage by a voltage regulator.

GoldCap

The GoldCap supplies the horn and the mains failure LED with operating voltage in the event of mains voltage failure. The GoldCap voltage accumulator also buffers microcontroller RAM.

Charging Circuit (GoldCap)

The internal + 5VD operating voltage charges via a resistor-diode circuit the GoldCap. The charging circuit is switched off once per second for testing purposes.

Mains Voltage Power Failure Recognition

A monoflop recognises a failure of the mains voltage supply.

Horn (Mains Voltage Failure)

A GoldCap provides for horn operating voltage in the event of a mains voltage failure.

Alarm LED Drive (Mains Voltage Failure)

A GoldCap provides for alarm LED operating voltage in the event of a mains voltage failure.

Serial Data Transmission

A driver module amplifies serial measurement data (skin temperature, mattress temperature and overtemperature), test signals and control signals.

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Multiplexer

The multiplexer switches the voltages (GCAPVOLT, +5 VLED) to the WT Controller PCB for testing.

Addressing and Drive for Actuators and Relays

An addressing module, a shift register and an amplification module call up the actuators and the safety relay for the radiant heater.

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Drive/Request for Mattress Heater

The operating voltage for the mattress heater is approximately 24 VAC. The heating circuit is isolated from the direct voltage and is protected with a fuse. A safety relay interrupts the heating circuit in case of error. A triac is used for switching of the heater during operation. A series connected zero-potential, phase group switch only switches the heater on when positive AC voltage passage occurs, and off when negative AC voltage passage occurs.

The voltage drop at the mattress heater generates impulses with a parallel connected optocoupler, which drive a monoflop. The monoflop output indicates that the mattress heater is in the operational mode.

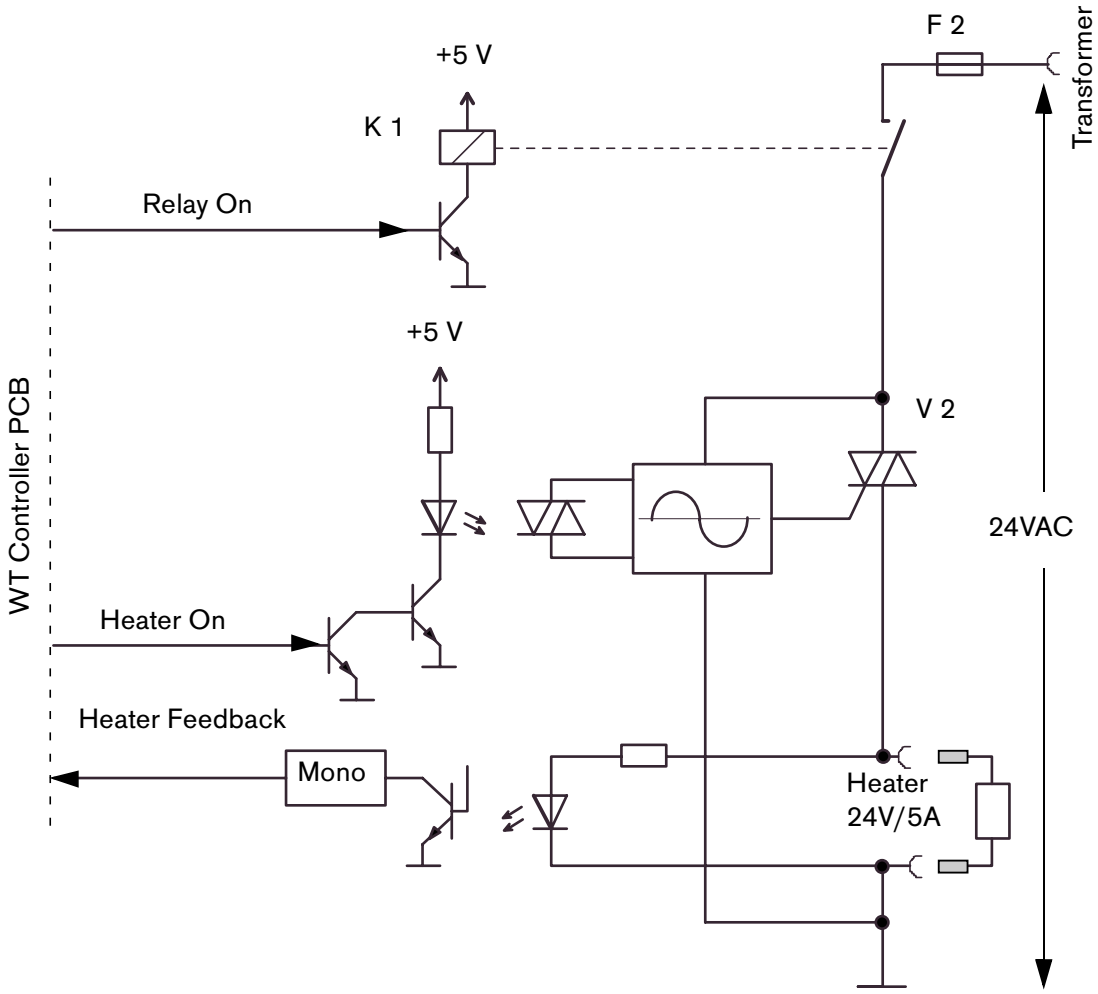

Fig. 20: Block diagram 3 of WT Power PCB

2.2.4 WT Relay PCB

The energy-saving lamps, the infrared rods, the Central Alarm PCB and the radiant heater phototherapy unit (optional) are driven by relays located on the WT Relay PCB. A triac controls the infrared rods.

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The WT Relay PCB contain the following subassemblies:

- Voltage selector switch
- Infrared rods drive/feedback
- Infrared rod safety relay
- Relays (energy-saving lamps, phototherapy unit (optional))
- Drive for Central Alarm PCB.

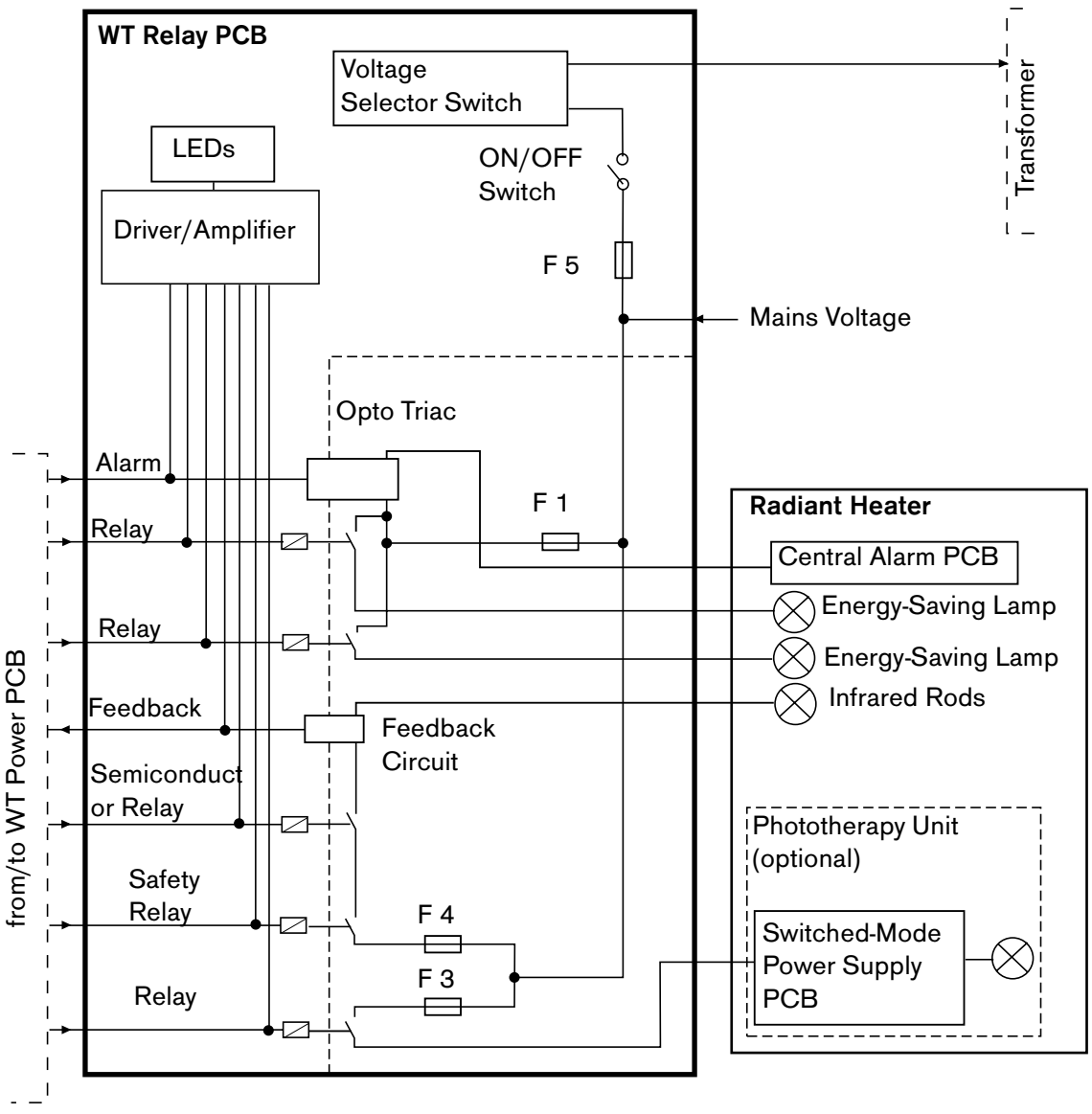

Fig. 21: Block Diagram of WT Relay PCB

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Voltage Selector Switch

The voltage selector switch allows for adapting the primary circuit of the toroidal-core power transformer to the local mains voltage.

Radiant Heater Drive/Feedback

An optocoupler drives the triac, which supplies the infrared rods with mains voltage. The voltage of the infrared rods generates an acknowledgement signal with an optocoupler.

Infrared Rod Safety Relay

The safety relay interrupts mains voltage to the infrared rods in the event of an error (e.g. “Inop”).

Relays (Energy-Saving Lamps, Phototherapy Unit (optional))

The relays supply the energy-saving lamps and the phototherapy unit (optional) with mains voltage.

Drive for Central Alarm PCB

An opto triac at the WT Relay PCB drives the central alarm lamp. The opto triac supplies the Central Alarm PCB with mains voltage.

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2.2.5 WT Controller PCB

The WT Controller PCB contains the following subassemblies:

- Microcontroller
- Quartz element
- EPROM
- EEPROM
- RAM
- Watchdogs
- Driver elements
- Multiplexer and A-D converter
- Linkage and drive for the mattress heater safety relay.

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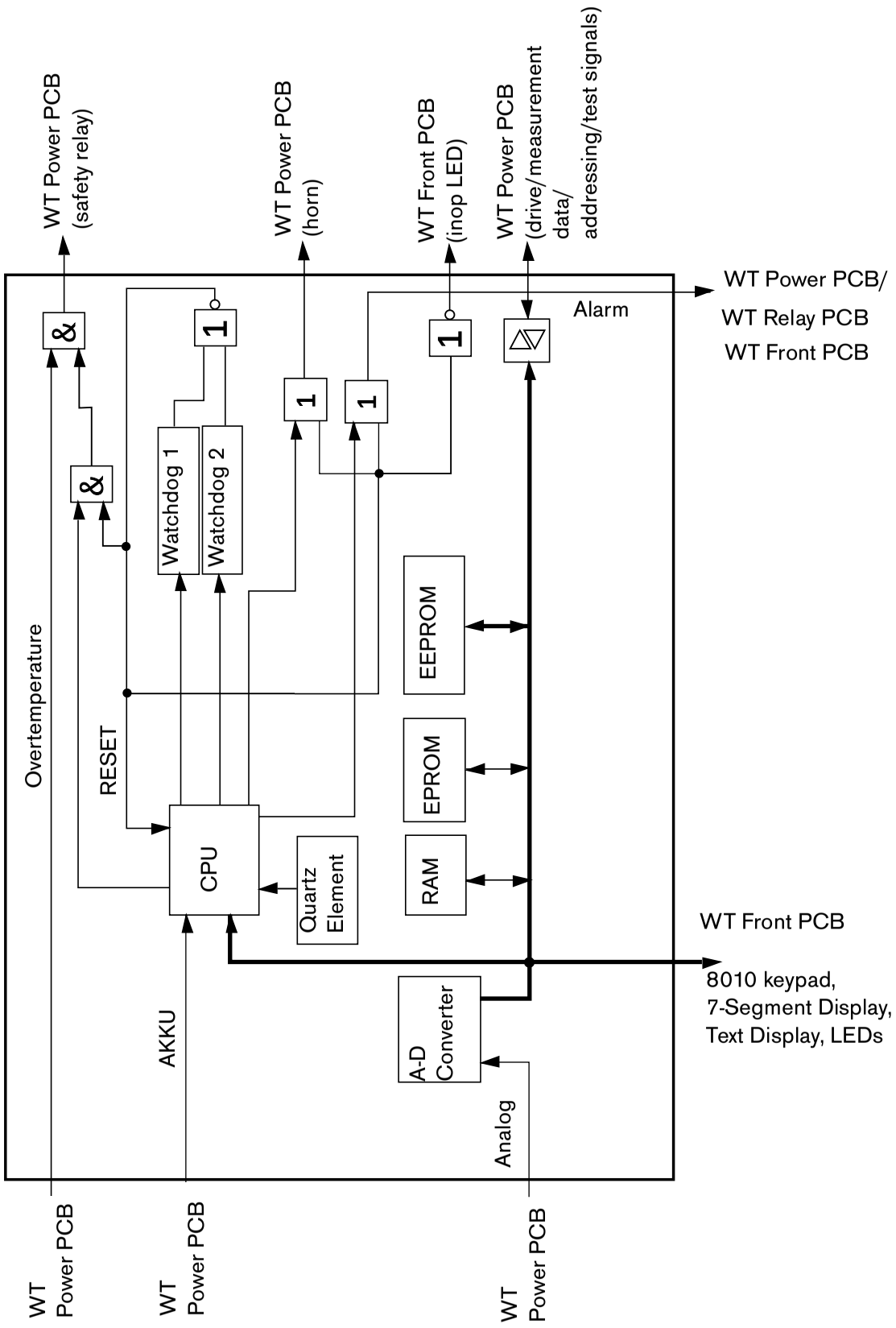

Fig. 22: Block Diagram of WT Controller PCB

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Microcontroller

The microcontroller controls and monitors the Babytherm program. The microcontroller contains 2 KB RAM. Target values are stored and buffered in this RAM. An accumulator RAM buffer voltage is generated by the GoldCap.

Quartz Element

The quartz element generates a pulse frequency of approximately 32 MHz. The microcontroller generates a frequency of 16 MHz with this pulse frequency.

EPROM

The EPROM contains the Babytherm software program.

EEPROM

The EEPROM stores device configuration data.

RAM

The RAM is the main memory.

Watchdogs

The watchdogs monitor the software program sequence of the microcontroller. The watchdogs are counting elements, which are timed with a separate quartz element.

If the microcontroller does not reset the counting elements, an EMERGENCY STOP signal is generated.

Driver Elements

The driver elements amplify the signals and adjust their levels for the actuator driver.

Multiplexer and A-D Converter

The A-D Converter converts the +5 VLED voltage and the GoldCap voltage into a digital data word. This data word is sent to the microcontroller for the purpose of evaluation.

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Linkage and Drive for the Mattress Heater Safety Relay

The overtemperature signal from the WT Power PCB and the output signal from the watchdogs are linked with the drive signal for the mattress heater safety relay.

If overtemperature occurs at the mattress heater, or if the watchdogs are not reset regularly, the mattress heater safety relay at the WT Power PCB power is switched off.

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2.2.6 WT Sensor PCB

The WT Sensor PCB includes the following subassemblies:

- Receiver and sender for serial data transmission
- Test signal select logic
- Measurements amplifiers (skin temperature, mattress heater)
- Overtemperature comparator
- Test circuit (41.6 °C - mattress heater)
- Test circuit (36.0 °C - skin temperature)
- A-D conversion with multiplexer.

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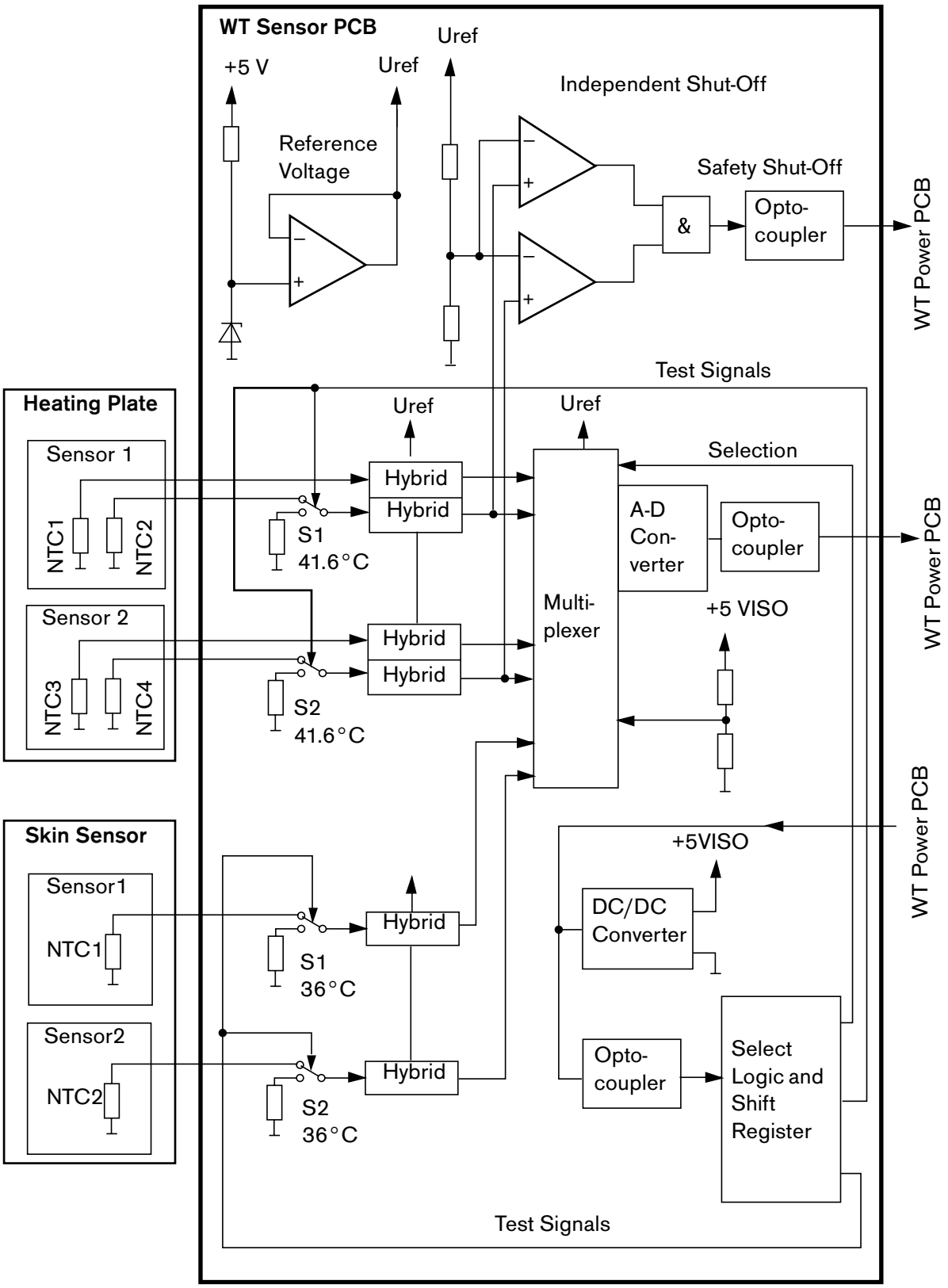

Fig. 23: Block diagram of WT Sensor PCB

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Receiver and Sender for Serial Data Transmission

Optocouplers transmit the serial measurement data (mattress heater, skin temperature) and the WT Sensor PCB operating voltage to the WT Power PCB. One optocoupler receives the test signals in serial mode for the measurement circuits. One optocoupler transmits the overtemperature signal to the WT Power PCB.

Test Signal Select Logic

An addressing module and a shift register convert the serial test signals into parallel data.

The test signals activate the following test circuits:

- Overtemperature, mattress heater (41.6 °C)
- Skin temperature (36 °C)

Measurement Amplifiers (Skin Temperature, Mattress Heater)

Two skin temperature hybrids measure the skin temperature.

Four measurement amplifiers (NTCs) measure the mattress temperature in pairs. The NTCs are installed to the mattress in pairs. The measurement values at a single pair may not deviate from one another more than 0.5 °C. The two measurement pairs may not deviate from one another more than 5 °C. One measurement amplifier per pair evaluates the overtemperature of the mattress heater (greater than 41.6 °C).

Overtemperature Comparator

Two comparators evaluate the mattress heater overtemperature signals. The comparators are set to a voltage value, which corresponds to a mattress temperature of greater than 41.6 °C.

If the mattress reaches a temperature of 41.6 °C or greater, The output level of the corresponding comparator approaches zero V. The mattress heater safety relay is switched off by the hardware.

Test Circuit (41.6 °C - Mattress Heater)

A test circuit regularly monitors for correct functioning of the mattress heater overtemperature comparator.

Test Circuit (36.0 °C - Skin Temperature)

The software monitors the skin temperature hybrid.

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Reference resistors, which are linked to the test circuits, are connected to the inputs of the skin temperature hybrids. The output voltage values of the skin temperature hybrids correspond to a temperature of 36.0 °C.

A-D Conversion with Multiplexer

The multiplexer sends an analog measurement signal (skin temperature and mattress temperature) to the integrated A-D converter. The serial output signal from the A-D converter is connected to an optocoupler.

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2.3 Panel

The panel consists of the following subassemblies:

- 8010 WT LED PCB
- 8010 keypad
- Text display
- WT Front PCB
- Loudspeaker.

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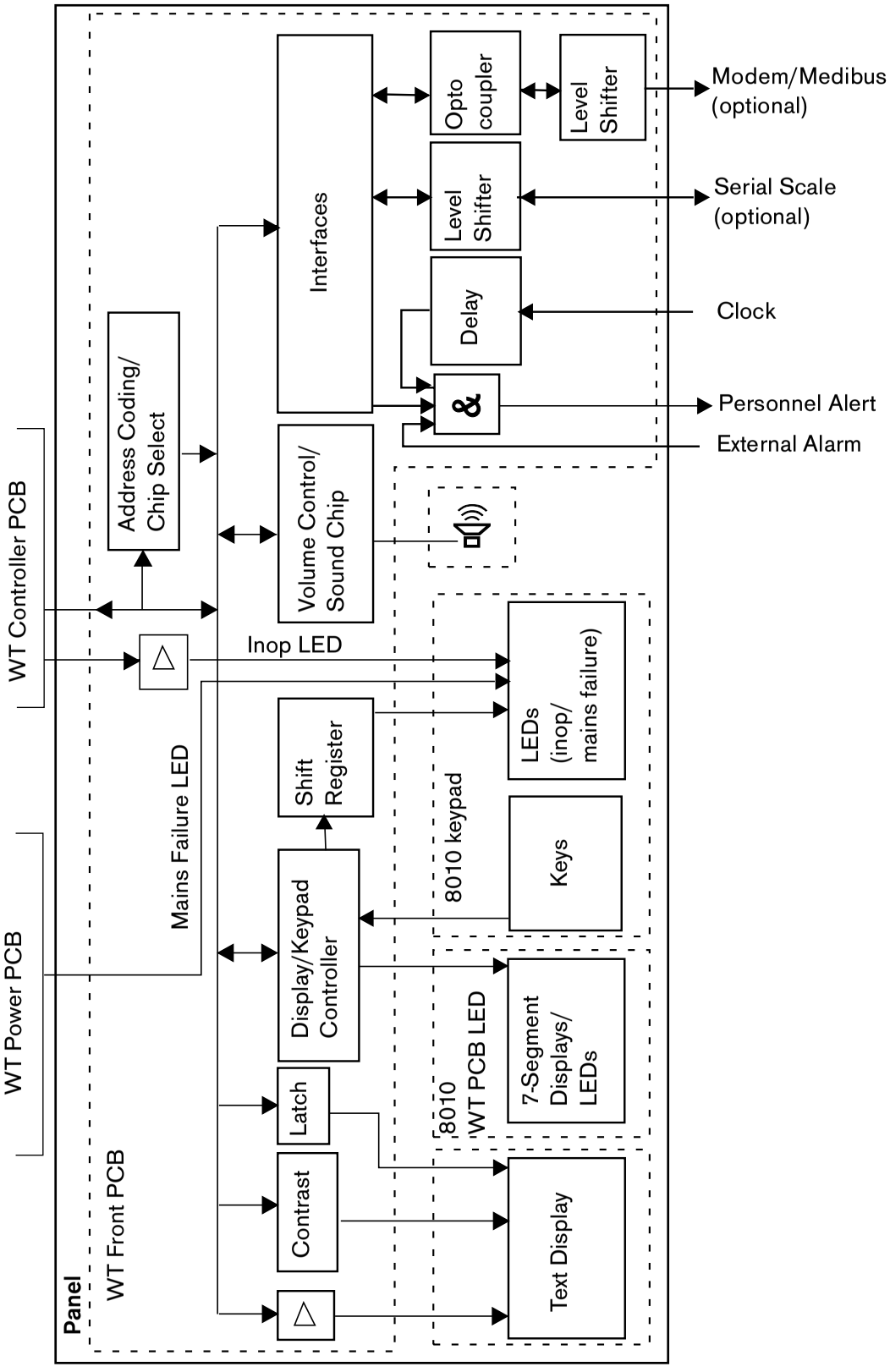

Fig. 24: Block diagram of the Panel

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2.3.1 8010 WT LED PCB

The 8010 WT LED PCB contains 7-segment displays and light emitting diodes.

The 7-segment displays represent the skin temperature and the mattress temperature. The LEDs represent the foot symbol and the mattress heater values < 36 °C and > 38 °C.

2.3.2 8010 Keypad

The 8010 keypad includes a key array, keys and LEDs.

2.3.3 Text Display (LC display)

The text display shows clear text messages (comments, warnings, alarms and commands).

2.3.4 Loudspeaker

Acoustic alarms are generated at the loudspeaker for alarms and comments. A volume control and a sound chip control the loudspeaker.

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2.3.5 WT Front PCB

A port component reads in the key array. LED drive is accomplished with decoders, shift registers and multiplex signals.

The WT Front PCB contains the following subassemblies:

- Address coding and chip select
- Sound chip with volume regulator
- Text display contrast adjustment
- Text display latch drive
- Voltage supply for text display backlighting
- Personnel alert
- Interface modules
- Level shifters
- Optocouplers
- Display module
- LED matrix drive.

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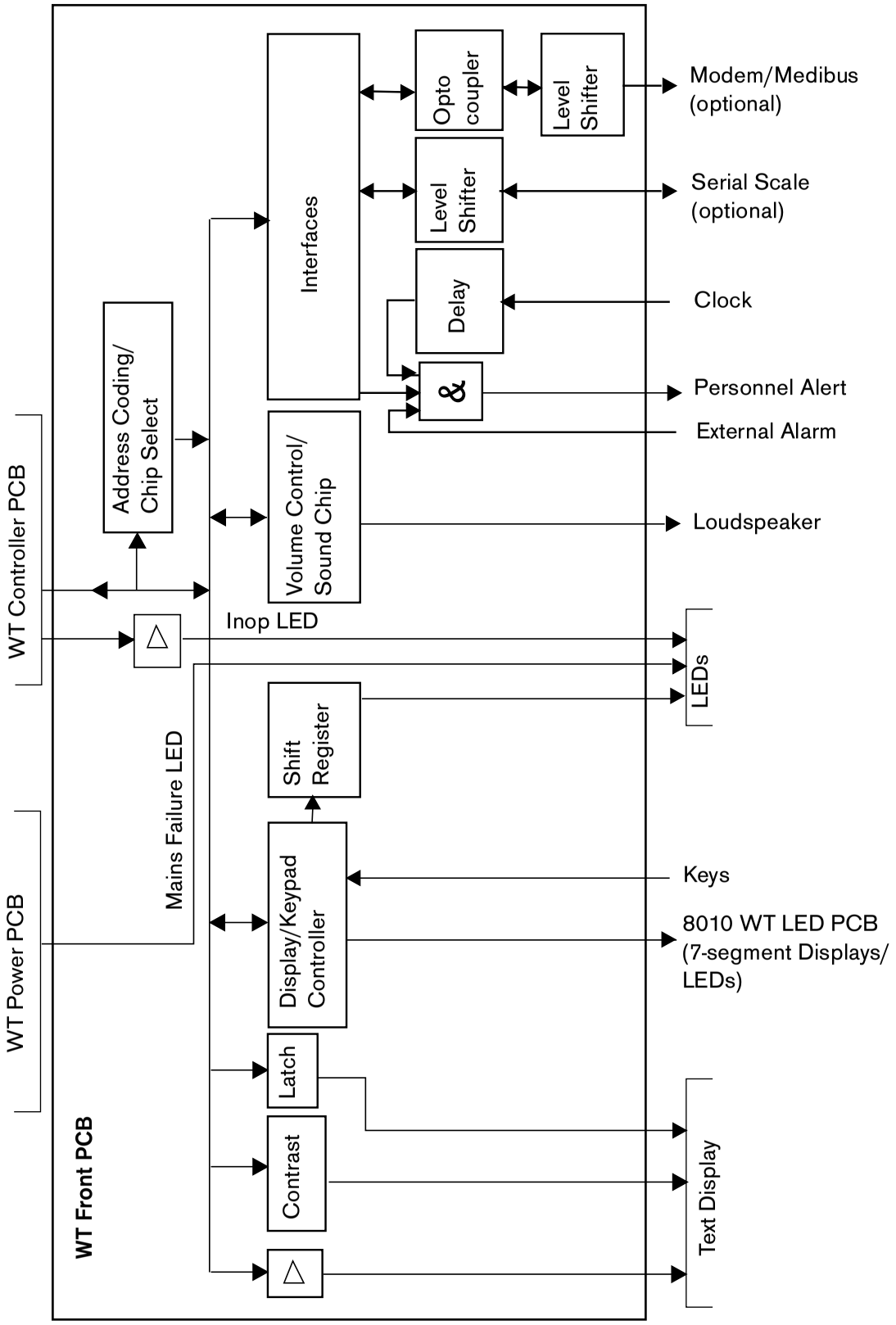

Fig. 25: Block Diagram of the WT Front PCB

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Address Coding and Chip Select

Addressing and selection modules select the various hardware components.

Sound Chip with Volume Regulator

The microcontroller links the output signal of the sound chip to the output signal of the volume regulator. The combined signal is amplified and fed to the loudspeaker.

The microcontroller can influence the volume of the volume regulator via software.

Text Display Contrast Adjustment

An amplifier module enables contrast adjustment at the text display.

Text Display Latch Drive

Latch modules drive the text display signal.

Voltage Supply for Text Display Illumination

A switching controller supplies the text display backlighting foil with a voltage of approximately 1.0 V to 5.0 V.

Personnel Alert

In the event of an alarm a relay is activated. The relay functions as a selector switch. An external alarm system can be connected to the selector switch (e.g. personnel alert).

An alarm delay prevents the personnel alert from being immediately activated after the Check key has been actuated.

Interface Modules

The interface modules link the data bus to the peripheral units (medibus, modem, scale).

Level Shifters

The level shifters adapt the WT Front PCB interface to the peripheral devices interfaces.

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Optocouplers

Optocouplers isolate the modem, the medibus and the central alarm from the WT Front PCB.

Display Module

The display module provides the 7-segment display with operating voltage. The display module selects the individual keys. The display module stores the actuated key in an storage area, and sends this as information to the data bus.

LED Matrix Drive

A shift register and select logic drive the LED matrix.

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3 Trolley

The trolley consists of a small or large trolley plate. The trolley plate is keyed to the metal casing of the column.

The Babytherm is available with various trolleys:

- Babytherm without electric height adjustment
- Babytherm with electric height adjustment (optional).

3.1 Electric Height Adjustment (Optional)

The trolley with electric height adjustment has an adjustable work height of 885 mm to 1180 mm (small lifting column) or 950 mm to 1245 mm (large lifting column).

3.2 Options (for Retrofitting)

- Swivel cabinet
- Infusion bottle holder
- Bed canopy
- Swivel tray.

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4 Resting Surface

The resting surface includes a mattress heater.

The resting surface consists of the following subassemblies:

- Resting surface
- Bottom section tilt mechanism, bolted to base plate
- Mechanical system of tilt mechanism
- 4 corners for holding glass panels.

Various side panels can be attached to the resting surface:

- Side panels, height 23 cm
- Side panels, height 15 cm
- inner walls, 7 cm.

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The resting surface is finely adjustable with click-stop positions. The head of the patient can be brought to the maximal upper position (20 °), or the maximal lower position (15 °).

- Pull the unlocking handle in direction **A**.
- If you push the handle down (**B**), you change the upper head position.
  If you pull the handle up (**C**), you change the lower head position.

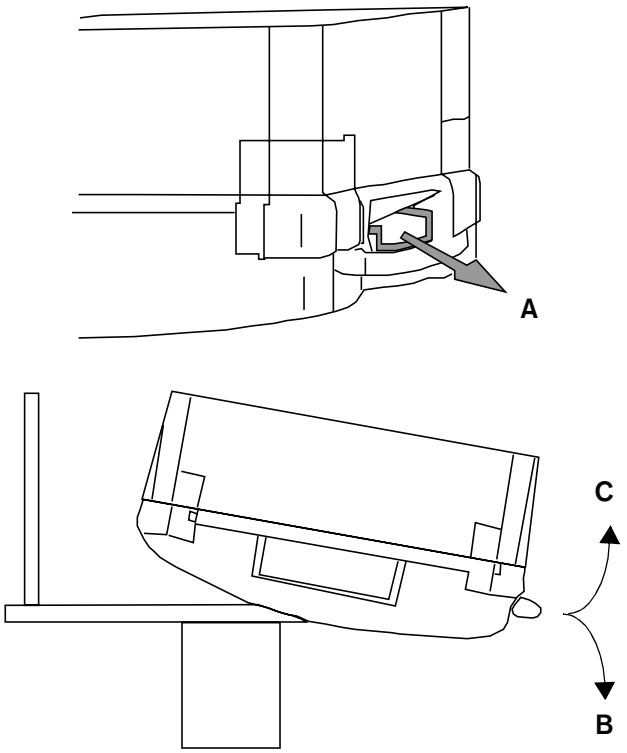

Fig. 26: Inclination adjustment for the resting surface

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4.1 X-ray drawer (Babytherm 8004)

Babytherm 8004 has a X-ray drawer.

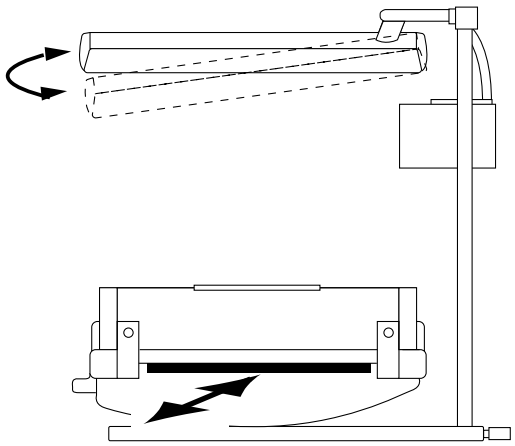

Fig. 27: Babytherm 8004 with X-ray drawer

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5 Mattress

The Babytherm 8010 may be used with different mattress.

5.1 Gel Mattress

The gel mattress consists of a highly heat-conductive gel that does not run or dislocate even when the bed is tilted. The gel is surrounded by a film of soft material compatible with the skin.

The mattress moulds itself to the body contours of the patient lying on it, thereby providing a large contact surface that transfers warmth to the patient and avoids pressure points (anti decubitus effect). The gel has good heat storage properties. If the mains supply is interrupted, e.g. for in-hospital transport, the patient will be kept warm about 15 minutes, provided the insulation is sufficient (blanket, cover).

When the gel mattress is cold, warmth is transferred from the patient to the mattress.

Risk of burns! Do not use gel mattress in other warming beds with heater plate temperatures above 40 °C. **Use the gel mattress in devices which have a lower heater plate temperatures than 40 °C.**

Risk of cooling the patient! The unheated gel mattress would cool the patient. **Use the gel mattress in conjunction with the resting surface heater.**

Risk of damage to the gel mattress! Sharp objects can damage the gel mattress. **Keep clear of sharp objects.**

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5.1.1 Unheated Foam Rubber Mattress

Use the unheated foam rubber mattress if the Babytherm 8010 does not work with the resting surface heater.

6 Pneumatics (Suction)

Two suction devices can be used in the Babytherm 8010:

- Suction device –0.9 bar
- Suction device –0.9 bar.

The infinite vacuum is generated by an ejector. The suction device is supplied by way of the O_2 or compressed-air system. All plastic parts subject to contamination can be sterilised in an autoclave at temperatures up to 134 °C.

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Test List

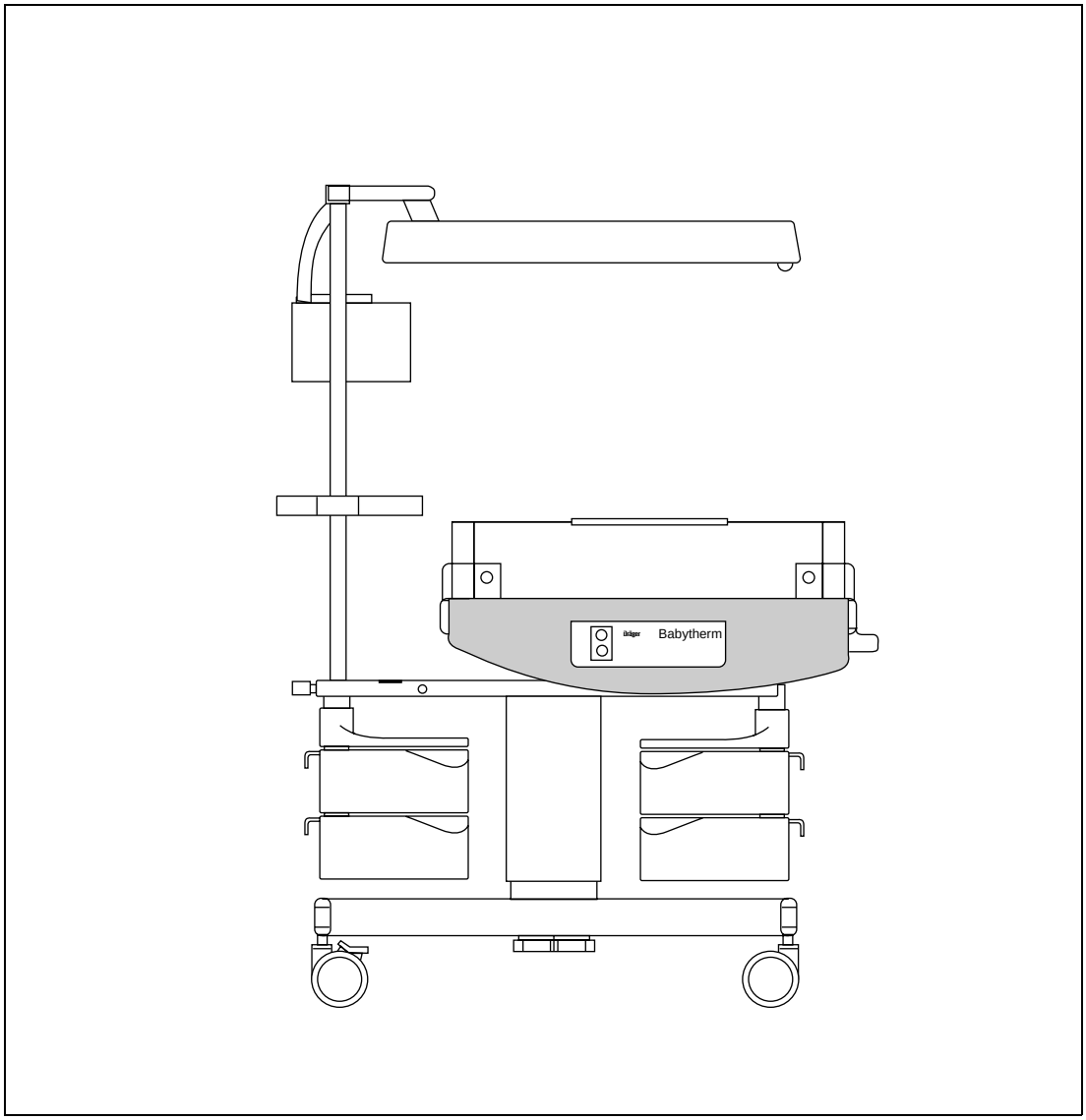
Babytherm 8004/8010

Serial no.: _____

Installation site: _____

Folder no.:
6132.300

Edition:
10/99



This Test List does not replace inspections and servicing by Dräger Medical AG & Co. KGaA

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1 Test Equipment

VDE tester	79 01 234
Short-circuit female connector VDE 0751	79 00 765
Short-circuit female connector for skin-temperature sensor	79 10 484

2 Accompanying Documents (applies only to Germany)

Instructions for Use GA 6132.300 e (class BF)

Logbook

Instructions for Use for special accessories ☐

3 General Condition

3.1 Trolley without Electrical Height Adjustment

Mains connection

Mains fuses

Wheels

Caps at tubular ends of trolley

Trolley ☐

3.2 Trolley with Electrical Height Adjustment (optional)

Mains connection

Mains fuses

Mains fuses of column

Wheels

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Caps at tubular ends of trolley

Foot pedals

Trolley ☐

3.3 Control Unit

On/off switch

Mains fuses

Keypad ☐

3.4 Radiant Heater

Mount

Swivel function

Protective guard

Infrared rods

Working light

Night light

Phototherapy lamps (optional)

Filters (optional) ☐

3.5 Resting Surface

Lower section

Upper section

Outer panels
(panels must always properly engage in corners of housing)

Corners of outer panel mounts

Inner panels (optional)

Tube entry ports

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Resting surface adjustment with locking lever ☐

3.6 Base Plate

Mount

Base plate

Standard rails

Stand

Shelf ☐

3.7 Foam Mattress (Babytherm 8004)

Foam mattress ☐

3.8 Gel Mattress (Babytherm 8010)

Gel mattress ☐

3.9 Swivel Cabinet (optional)

Swivel cabinet/swivel cabinets ☐

3.10 Hook Rail (optional)

Hook rail ☐

3.11 Side Handle on Resting Surface (optional)

Side handle ☐

3.12 Hood (optional)

Hood

Hood holder ☐

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4 Tests as per VDE 0751 Part 1 (follow to local legislation, standards and regulations)

Condition of power cord

Mains fuses

(Main fuses should match the values specification on nameplate.) ☐

Test electrical safety using the common power cord of the Babytherm 8004 or the Babytherm 8010.

The resting surface of the mattress heater is not to be earthed on the Babytherm 8004 or Babytherm 8010 of class BF.

4.1 Checking the Protective Conductor Resistance

This section describes how to measure the protective conductor resistance of the trolley, column, electrical height adjustment (optional), mount of the control unit, and mattress heater (Babytherm 8010).

- Plug the power cord of the Babytherm into the VDE tester.
- Connect COM test probe into the COM test socket of the VDE tester.
- Plug the power cord of the VDE tester into the mains power outlet.
- Switch on the VDE tester.
- Apply the COM test probe to the trolley, column, electrical height adjustment (optional), mount of the control unit, and the aluminium plate of the mattress heater (Babytherm 8010) and, at the same time, press the “protective conductor button” on the VDE tester.

The protective conductor resistances of the trolley, column, electrical height adjustment (option), mount of the control unit should be equal to or lower than 0.2 Ohm. ☐

The protective conductor resistance of the aluminium plate of the mattress heater (Babytherm 8010) should be ∞ Ohm. ☐

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4.2 Checking the Equivalent Leakage Current

- Plug the power cord of the Babytherm into the VDE tester.
- Plug the power cord of the VDE tester into the mains power outlet.
- Switch on the Babytherm.
- Switch on the VDE tester.
- Press the foot pedals of the optional electrical height adjustment and press, at the same time, the “leakage current” button on the VDE tester.

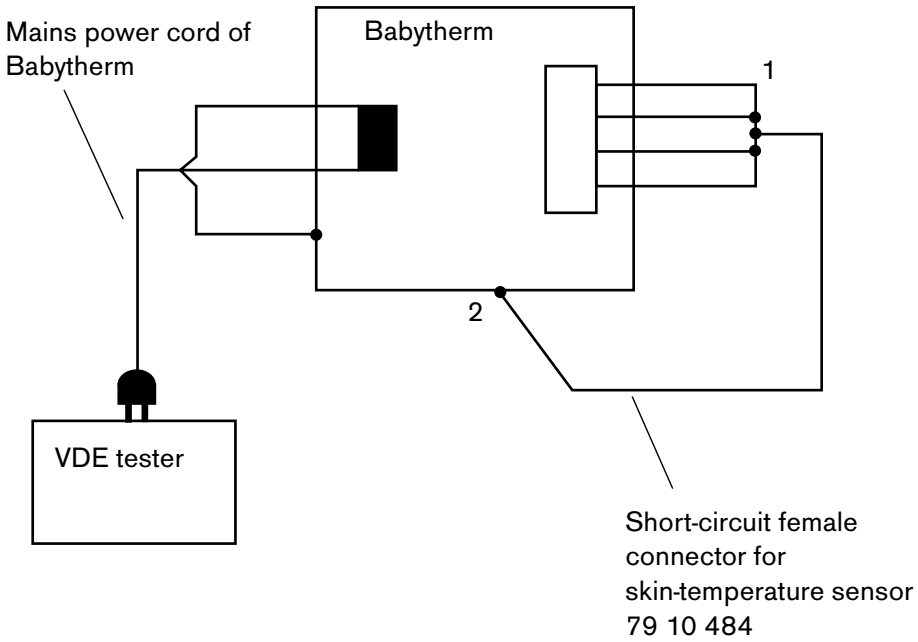

Fig. 1: Equivalent Leakage Current Test Setup

Legend

1 Sensor connections

2 Unit earth (earthing stud)

The equivalent leakage current should be equal to or lower than 1.0 mA. ☐

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4.3 Checking the Patient Leakage Current

- Plug the power cord of the Babytherm into the VDE tester (see Figure below).
- Plug the power cord of the VDE tester into the mains power outlet.
- Switch on the VDE tester.
- Switch on the Babytherm.

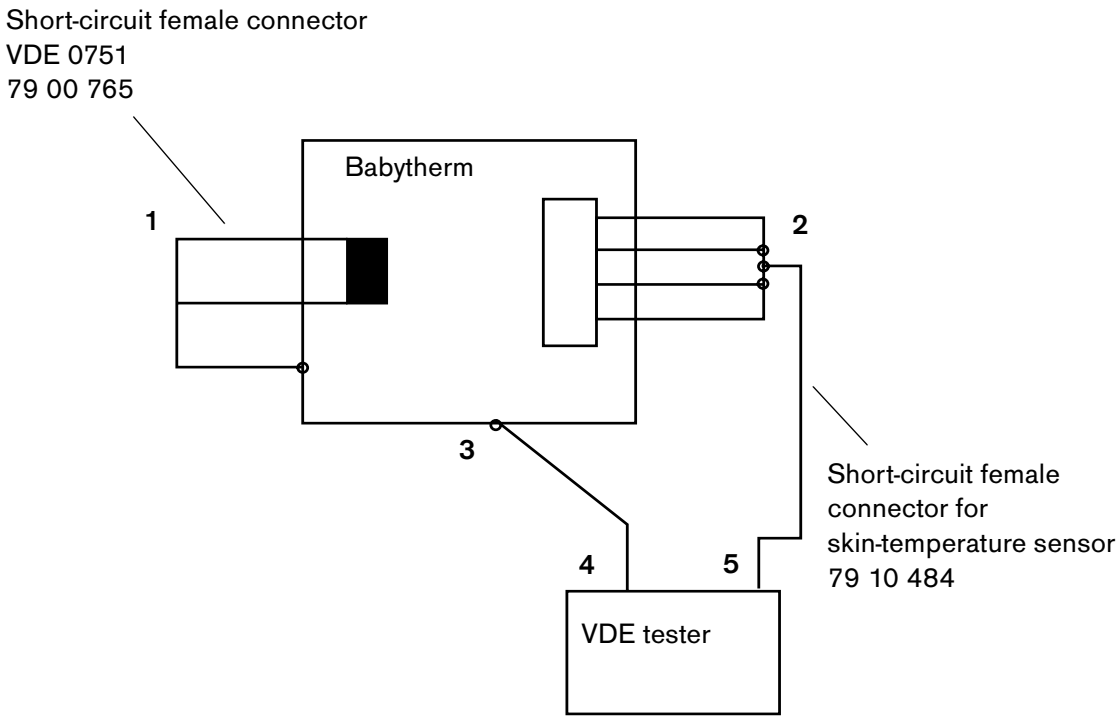

Fig. 2: Patient Leakage Current Test Setup

Legend

1 Short-circuit in mains connector (connector item no. 7900765)
2 Skin temperature sensor short circuit (item no. 7910484)
3 Unit earth (earthing stud)
4 Socket SL (previously COM) on portable tester
5 Socket ABL on portable tester

The patient leakage current should be equal to or lower than 4.0 mA. ☐

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5 Functional Tests

5.1 Checking the LEDs, the LED Strip and the Buzzer in the Control Unit as well as Central Alarm Lamp in the Radiant Heater

- Plug the power cord of the Babytherm 8004 into the mains power outlet.
- Switch on the control unit.
- Press the "Check" key.

The LEDs and the LED strip on the control unit come on. The central alarm lamp in the radiant heater comes on. The buzzer in the control unit sounds. ☐

5.1.1 Checking the Infrared Rods in the Manual Mode

- Switch on the control unit.
- Set "manual mode" on control unit.

The infrared rods heat up. ☐

5.1.2 Checking the Infrared Rods in the Skin Mode

- Connect skin-temperature sensors to the Babytherm.
- Switch on the control unit.
- Set "skin mode" on control unit.
- Place fingers firmly around ends of skin-temperature sensor cables.

The infrared rods heat up. The temperature displayed on the control unit increase. ☐

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5.1.3 Checking the Work Light in the Radiant Heater

- Switch on the control unit.
- Press the work light key.

The energy-saving lamps (work light and night light) in the radiant heater come on. ☐

Press the work light key again.

The energy-saving lamps (work light and night light) in the radiant heater go out. ☐

5.1.4 Checking the Night Light in the Radiant Heater

- Switch on the control unit.
- Press the night light key.

The small energy-saving lamp (night light) comes on. ☐

- Press the night light key again.

The small energy-saving lamp (night light) goes out. ☐

5.1.5 Checking the Phototherapy Lamps in the Radiant Heater (option)

- Switch on the control unit.
- Press the phototherapy key.
- Press the OK key.

All phototherapy lamps (halogen lamps) come on. ☐

- Press the phototherapy key again.
- Press the OK key.

All phototherapy lamps (halogen lamps) go out. ☐

5.1.6 Checking the Mattress Heater (Babytherm 8010)

- Place the gel mattress on the resting surface.
- Switch on the control unit.

The mattress heater warms up to the specified value. ☐

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5.1.7 Checking the Mains Failure Alarm

- Unplug the power cord of the Babytherm from the mains power outlet.
- Switch on the control unit.

The red LED on the control unit comes on. The buzzer for mains failure alarm sounds. ☐

- Plug the power cord of the Babytherm into the mains power outlet.

The Babytherm continue to operate with the previous specified settings. ☐

- Plug the power cord of the Babytherm into the mains power outlet.

The Babytherm continue to operate with the previous specified settings. ☐

6 Place fully functional unit at customer's disposal.

7 Tested

Date: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ Name: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

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1 Work Light

1.1 General Information about the Work Light

The big energy-saving lamp of the radiant heater must be replaced if it is defective.

1.2 Dismounting/Replacing the Work Light

- Plug the power cord of the Babytherm into mains power outlet.
- Set the electronical height adjustment (optional) of the Babytherm to the lowest position.
- Unplug the power cord of Babytherm from the mains power outlet.

Hot parts! The halogen lamps or infrared rods may cause burns if touched shortly after use of the radiant heater. **Allow the radiant heater to cool off for at least 15 minutes before servicing.**

- Swivel the radiant heater in your direction.
- Remove the defective energy-saving lamp **1** (work light) by holding the lamp mount **2** and by turning the energy-saving lamp counter-clockwise.

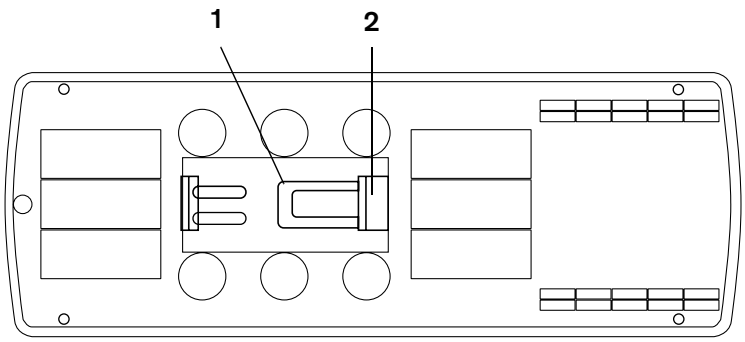

Fig. 1: Bottom view of the radiant heater, dismounting the work light

- To mount the new energy-saving lamp **1** (work light) hold the lamp mount **2** and tighten the energy-saving lamp by turning it clockwise.
- Plug the power cord of the Baybtherm into mains power outlet.
- Switch on the Babytherm.

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- Check the function of the energy-saving lamp by pressing the work light key on the control unit.

The energy-saving lamps of the radiant heater come on.

- Press the work light key again.

The energy-saving lamps of the radiant heater are off.

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2 Night Light

2.1 General Information about the Night Light

The small energy-saving lamp must be replaced if it is defective.

2.2 Dismounting/Replacing the Night Light

- Plug the power cord of the Babytherm into mains power outlet.
- Set the electronical height adjustment (optional) of the Babytherm to the lowest position.
- Unplug the power cord of Babytherm from the mains power outlet.

Hot parts! The halogen lamps or infrared rods may cause burns if touched shortly after use of the radiant heater. **Allow the radiant heater to cool off for at least 15 minutes before servicing.**

- Swivel the radiant heater in your direction.
- Remove the defective energy-saving lamp **1** (night light) by holding the lamp mount **2** and by turning the energy-saving lamp counter-clockwise.

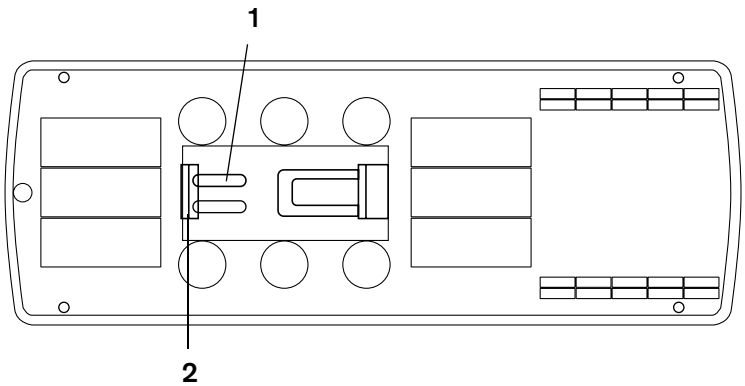

Fig. 2: Bottom view of the radiant heater, dismounting the night light

- To mount the new energy-saving lamp **1** (night light) hold the lamp mount **2** and tighten the energy-saving lamp by turning it clockwise.
- Plug the power cord of the Baybtherm into mains power outlet.
- Switch on the Babytherm.
- Check the function of the energy-saving lamp (night light) by pressing the night light key.

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The night light of the radiant heater comes on.

- Press the night light key again.

The night light of the radiant heater is off.

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3 Phototherapy (Option)

3.1 General Information about the Phototherapy Lamps

The phototherapy lamps (halogen lamps) have to be replaced after 1000 operating hours or if one or more phototherapy lamps (halogen lamps) are defective. Have the complete set (6 halogen lamps) replaced by trained service personnel.

3.2 Checking the Phototherapy Lamps

- Plug the power cord of the Babytherm into mains power outlet.
- Switch on the Babytherm.
- Press the phototherapy key on the control unit.
- Press the OK key.

All phototherapy lamps (halogen lamps) in the radiant heater come on.

- Press the phototherapy key again.
- Press the OK key.

All phototherapy lamps (halogen lamps) in the radiant heater are off.

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3.3 Dismounting/Replacing the Phototherapy Lamps

- Plug the power cord of the Babytherm into mains power outlet.
- Set the electronical height adjustment (option) of the Babytherm to the lowest position.
- Unplug the power cord of the Babytherm from mains power outlet.

Hot parts! The halogen lamps or infrared rods may cause burns if touched shortly after use of the radiant heater. **Allow the radiant heater to cool off for at least 15 minutes before servicing.**

- Swivel the radiant heater in your direction.
- Remove the fixing screws and washers **1** which secure the cover **2** and place the cover aside.

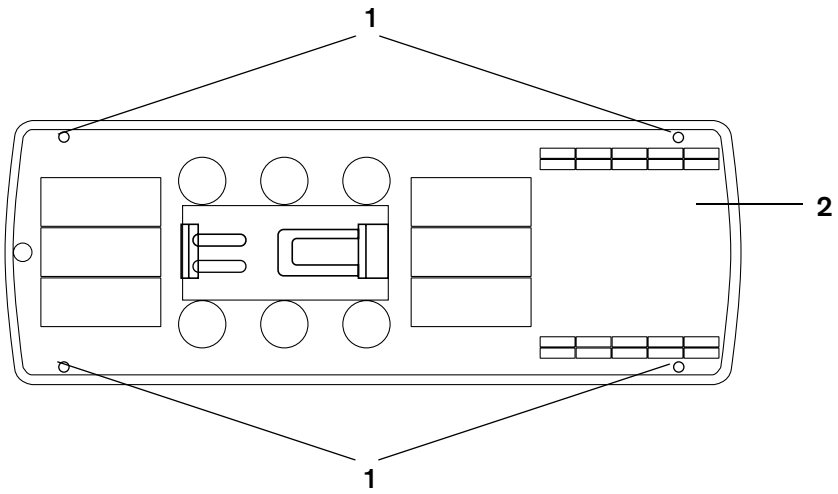

Fig. 3: Bottom view of the radiant heater, removing the cover

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- Remove the phototherapy lamps (halogen lamps) **1** by pulling them out together with the halogen lamp supports.

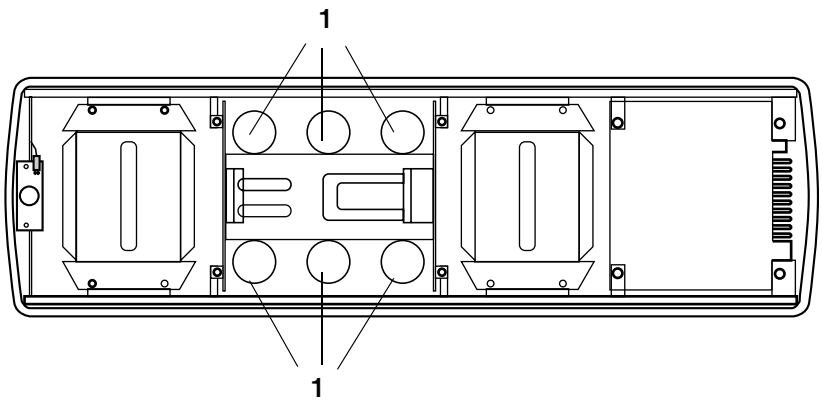

Fig. 4: Bottom view of the radiant heater, removing the phototherapy lamps

- Mount the new phototherapy lamps (halogen lamps) including halogen lamp supports **2** into the radiant heater (pay attention to the mounting position of the halogen lamp supports, see Figure below).

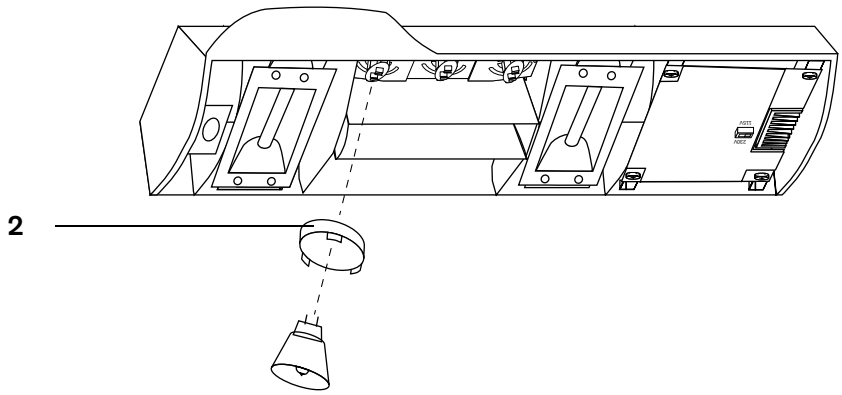

Fig. 5: View of the radiant heater, mounting the phototherapy lamps

- Mount the Babytherm using the reverse method of that used for dismounting.
- Plug the power cord of the Babytherm into mains power outlet.
- Switch on the Babytherm.
- Press the phototherapy key.

All phototherapy lamps (halogen lamps) come on.

- Mount the cover on the radiant heater.
- Plug the power cord of the Babytherm into mains power outlet.

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- Switch on the Babytherm.
- Press the phototherapy key on the control unit.
- Press the OK key.
- Hold on OK key **1** for approx. 3 seconds.

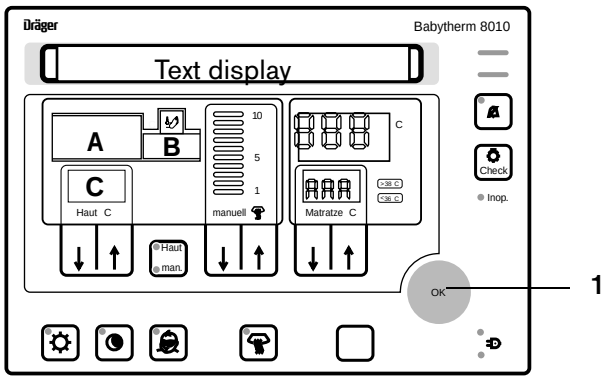

Fig. 6: Front view of the control unit, using the Configuration Mode

Message on text display:

Configuration Mode **Starting with OK**

- Select the Configuration Mode by pressing the OK key **1** (see Figure above).

Message on text display:

Configuration Mode **Mode c01: Software Version**

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- Select the mode c04 by pressing the arrow keys **1**.

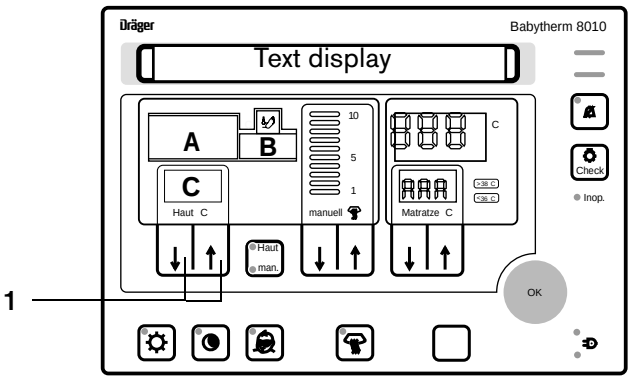

Fig. 7: Front view of the control unit, using the Configuration Mode

Message on the text display:

Configuration Mode **Mode c04: Time counter photo therapy**

- Reset the Timer of the phototherapy by pressing the alarm key **2** for minimum 3 seconds.

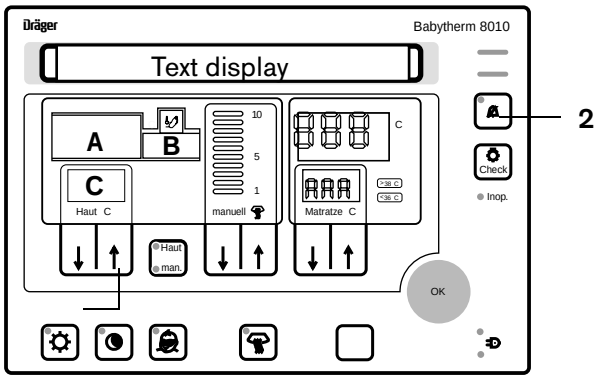

Fig. 8: Front view of the control unit, using the Configuration Mode

Exiting the Configuration Mode

- Press the OK key to exit the Configuration Mode.

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Changes

1 Type of Change

This service manual reflects the state of technology which applied in October 1999.

Type of Change	Date
Functional description of Babytherm 8002 is delated	10/99
New spare parts list - edition 10/99	10/99
New Test list - edition 10/99	10/99
New spare parts list - edition 11/2000	11/2000
New spare parts list - edition 05/2001	05/2001

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Appendix

1 Abbreviations

Abbreviations	Meaning/Explanation
but	Key test in Configuration Mode
CON	Display contrast in Configuration Mode
c 01 bis c 08	Codes in the Configurations Mode
c 01	Displaying current software version
c 02	Set skin temperature deviation
c 03	Set volume of soft alarm
c 04	Dispolaying operating hours of phototherapy
c 05	keyboard test
c 06	Nurse call test
c 07	Set language
c 08	Set display contrast
Err	error Mode
FXX	error Number
Inop	Malfunction
LAN	Set Language in Configuration Mode
Nuc	Nurse call test in Configuration Mode
SdE	Maximum skin temperature deviation in Configuration Mode
SSL	Volume of the soft alarm in Configuration Mode

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2 Spare parts list

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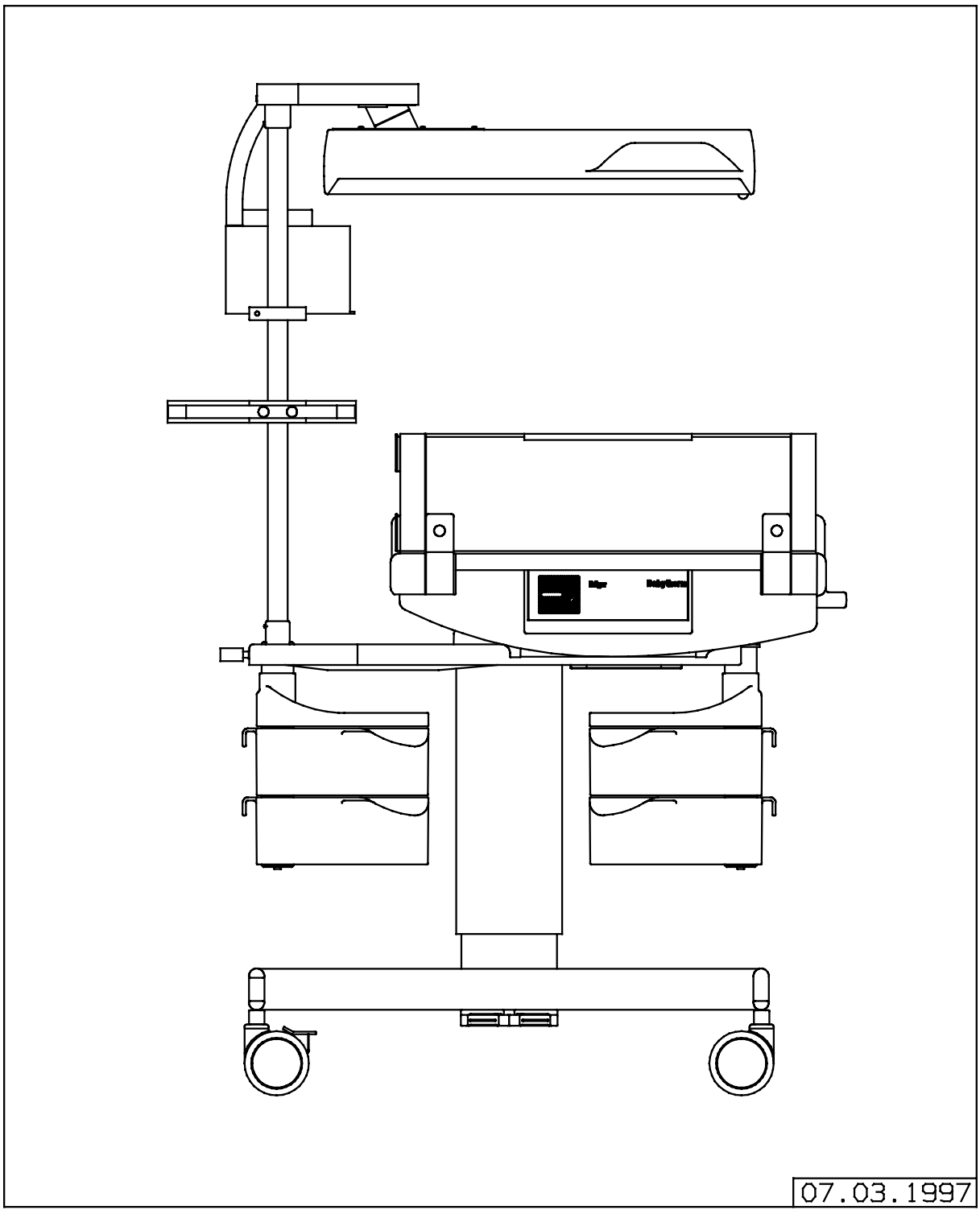

07.03.1997

Diese Ersatzartikelliste gilt für Sachnummer:
This spare parts list is valid for part no.:

Sach-Nr. **Part No.**	**Benennung** **Description**
FR00104	BT8004 220-240V BAUKASTEN BT8004 220-240V MODULAR SYSTEM
FR00105	BT8010 100V-240V BABYTHERM 8010 100V-240V

Inhaltsverzeichnis der Bilder
Summary of pictures

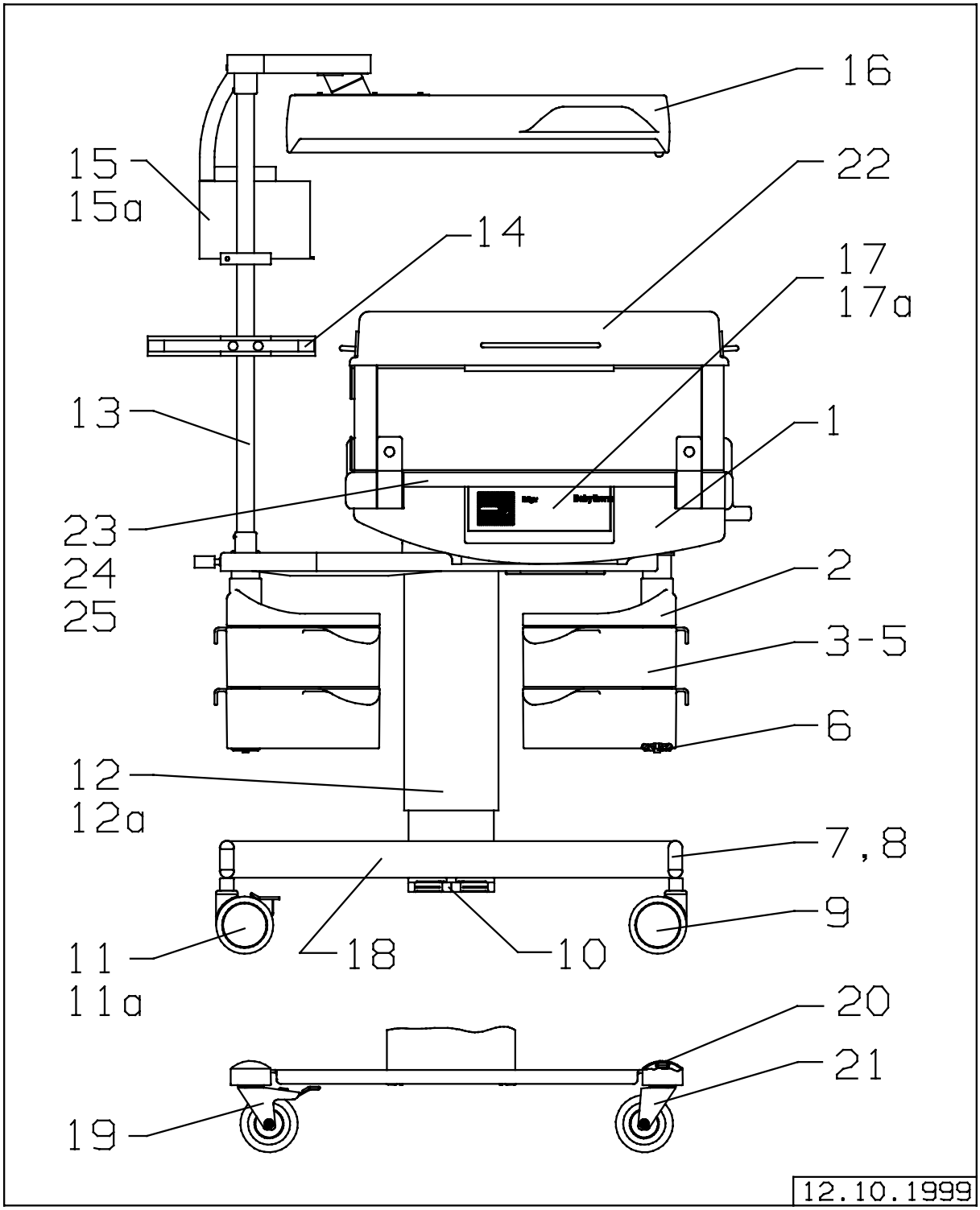
Bild **Picture**	**Bezeichnung** **Description**	**Sach-Nr.** **Part No .**	**E-Liste** **Spare parts list**
1	GESAMTGERÄT COMPLETE DEVICE		
2	ELEKTRONIK ELECTRONIC		
3	FRONTPLATTE FRONT PANEL		
4	STRAHLER PROJECTOR		
5	SENSOREINSCHUB PLUG-IN UNIT FOR SENSOR		
6	FUSSPEDALE, VOLLST. PEDAL, CPL.	2M20290	
7	GRIFFLEISTE HANDLE	2M20862	
8	LIEGEBETTCHEN COT	2M30263	
9	BASSINET, COMPL. (X-RAY) BASSINET, COMPL. (X-RAY)		
10	SCHRAEGSTELLUNG, VOLLST. INCLINATION, CPL.	2M20854	
11	VERRIEGELUNG,VOLLST. LOCK, CPL.	2M20838	
12	SATZ SCHEIBEN,HOEHE 15 CM SIDE WALLS,HEIGHT 15CM		
13	SATZ SCHEIBEN,HOEHE 23 CM SIDE WALLS,HEIGHT 23CM		
14	HEIZPLATTE,VOLLST. HOT PLATE, CPL.	2M21510	
15	NETZ BASISPLATTE BASIC PLATE FOR NET		

Zubehör ohne Abbildung:
Accessories without pictures:

Benennung **Description**	**Sach-Nr.** **Part No.**	**Bestell-Nr.** **Order-Code**	**Packung** **Quantity**
GEL-MATRATZE / BABYTHERM 8000 GEL-MATTRESS / BABYTHERM 8000		2M20827	
MATRATZE MATTRESS		2M21012	
RS DTLD./OESTERR. SET GERMAN/AUSTRIA		2M30250	
RS GB/IRLAND SET GB/IRELAND		2M30251	
RS USA/CANADA SET USA/CANADA		2M30252	
RS FRANKREICH SET FRANCE		2M30253	
RS SPANIEN SET SPAIN		2M30254	
RS BELG/LUX/SCHWEIZ SET BEL/LUX/SCHWEIZ		2M30260	
RS RUSSLAND SET RUSSIA		2M30286	
OXYBOX II MOUNTING KIT OXIBOX II		2M30352	
RS PHOTOTHERAPIE MODIFICATION KIT PHOTOTHERAPY		2M30450	

GESAMTGERÄT
COMPLETE DEVICE

Bild/Picture 1

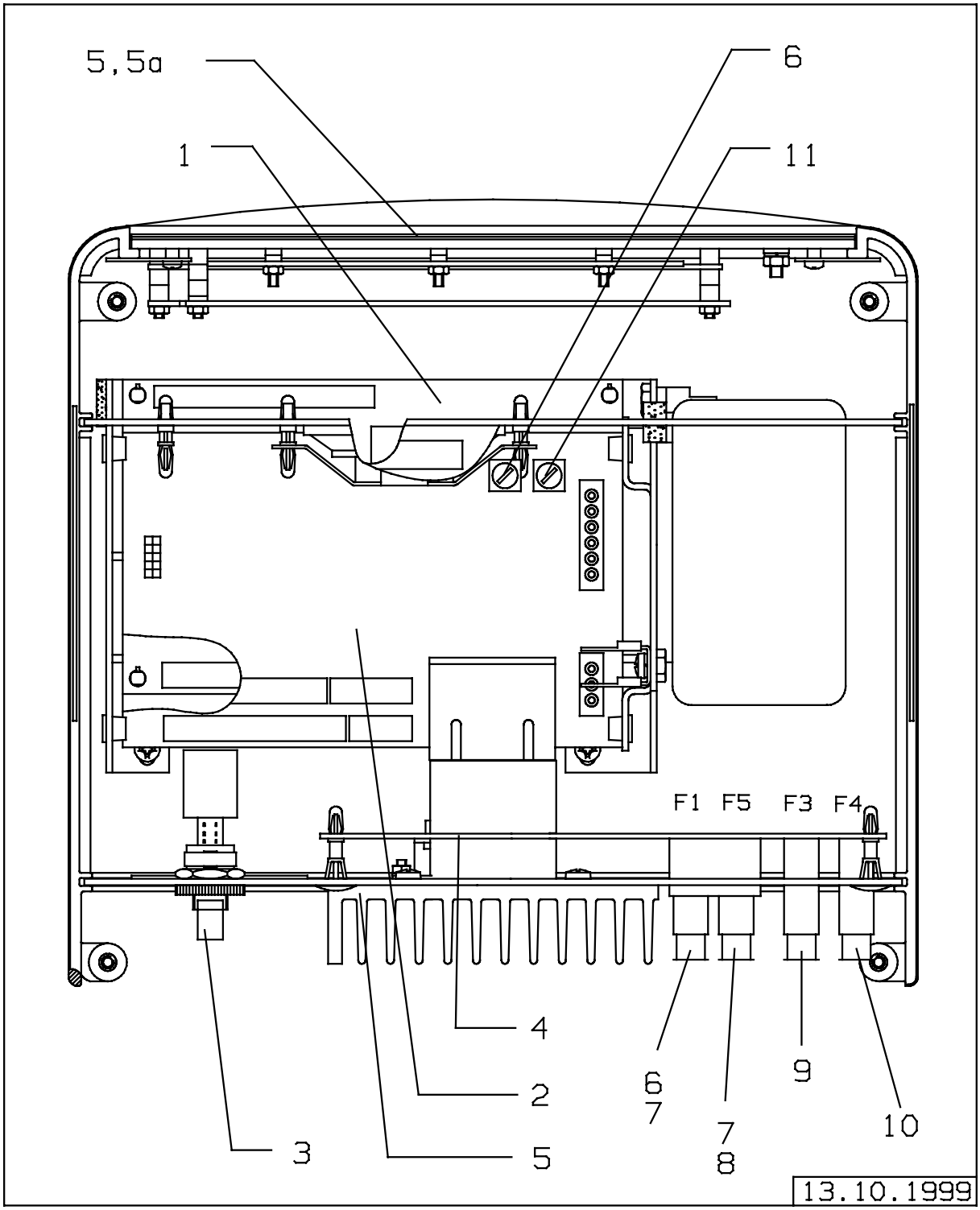


Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1	LIEGEBETTCHEN,VOLLST. COT		2M30263	
2	SCHWENKPLATTE SWIVELLING PLATE	2M20628		
3	SCHWENKSCHRANK,VOLLST. SWIVEL CUPBOARD, CPL.		2M20638	
4	EINSATZ INSERT		2M20642	2
5	SCHWENKLADE SWIVELLING DRAWER	2M20627		
6	SCHRANKBEFESTIGUNG BABYTHERM INSTALL.SET CUPBOARD BABYTHERM		2M20868	
7	KAPPE CAP		2M20348	
8	KAPPE WS CAP	2M21223		
9	LENKROLLE 125 MM GUIDE ROLL 125 MM		2M20792	
10	FUSSPEDALE, VOLLST. PEDAL, CPL.		2M20290	
11	FESTSTELL-LENKROLLE 125 MM FIXING GUIDE ROLL 125 MM		2M20794	
11a	ROLLE MIT FESTSTELLER FIXING GUIDE ROLL		2M30405	
12	HOEHENVERSTELLUNG110V/86-116CM ALTITUDE ADJUSTMENT110V/-116CM		2M20946	
12a	HOEHENVERSTELLUNG230V/86-116CM ALTITUDE ADJUSTMENT230V/-116CM		2M20940	
13	STATIV,KOMPLETT SUPPORT, CPL.	2M30231		
14	ABLAGEPLATTE BT 8000 DEPOSIT PLATE		2M21158	
15,17,23	ELEKTRONIK 8004 ELECTRONIC UNIT 8004	2M30190		
15a,17a, 24,25	ZENTRALELEKTRONIK 8010 ELECTRONIC UNIT 8010	2M30000		
16	WAERMESTRAHLER 230V RADIANT HEATER 230V		2M30152	
16	WAERMESTRAHLER 110V RADIANT HEATER 110V		2M30153	

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
17	SENSOREINSCHUB 8004 PLUG-IN UNIT SENSOR 8004	2M30203		
17a	SENSOREINSCHUB 8010 PLUG-IN UNIT SENSOR 8010	2M30202		
18	FAHRGESTELL,GROSS F.VAR.SAEULE TROLLEY,LARGE F.ADJ.HEIGHT		2M21036	
19-21	FAHRGESTELL FEST BT.OC NIEDRIG FIXED HEIGHT PEDESTAL BTOC LOW		2M22018	
19	FESTSTELL-LENKROLLE FIXING GUIDE ROLL		2M21050	
20	ABDECKKAPPE CAP		2M20989	
21	LENKROLLE GUIDE ROLL		2M21048	
22	KLAPPHAUBE HINGED HOOD		2M30392	
23	MATRATZE MATTRESS		2M21012	
24	GEL-MATRATZE / BABYTHERM 8000 GEL-MATTRESS / BABYTHERM 8000		2M20827	
25	HEIZPLATTE,VOLLST. HOT PLATE, CPL.		2M21510	
	SCHILDERSATZ (OHNE ABBILDUNG) SET OF LABELS (WITHOUT ILLUSTRATION)		2M21896	

ELEKTRONIK
ELECTRONIC

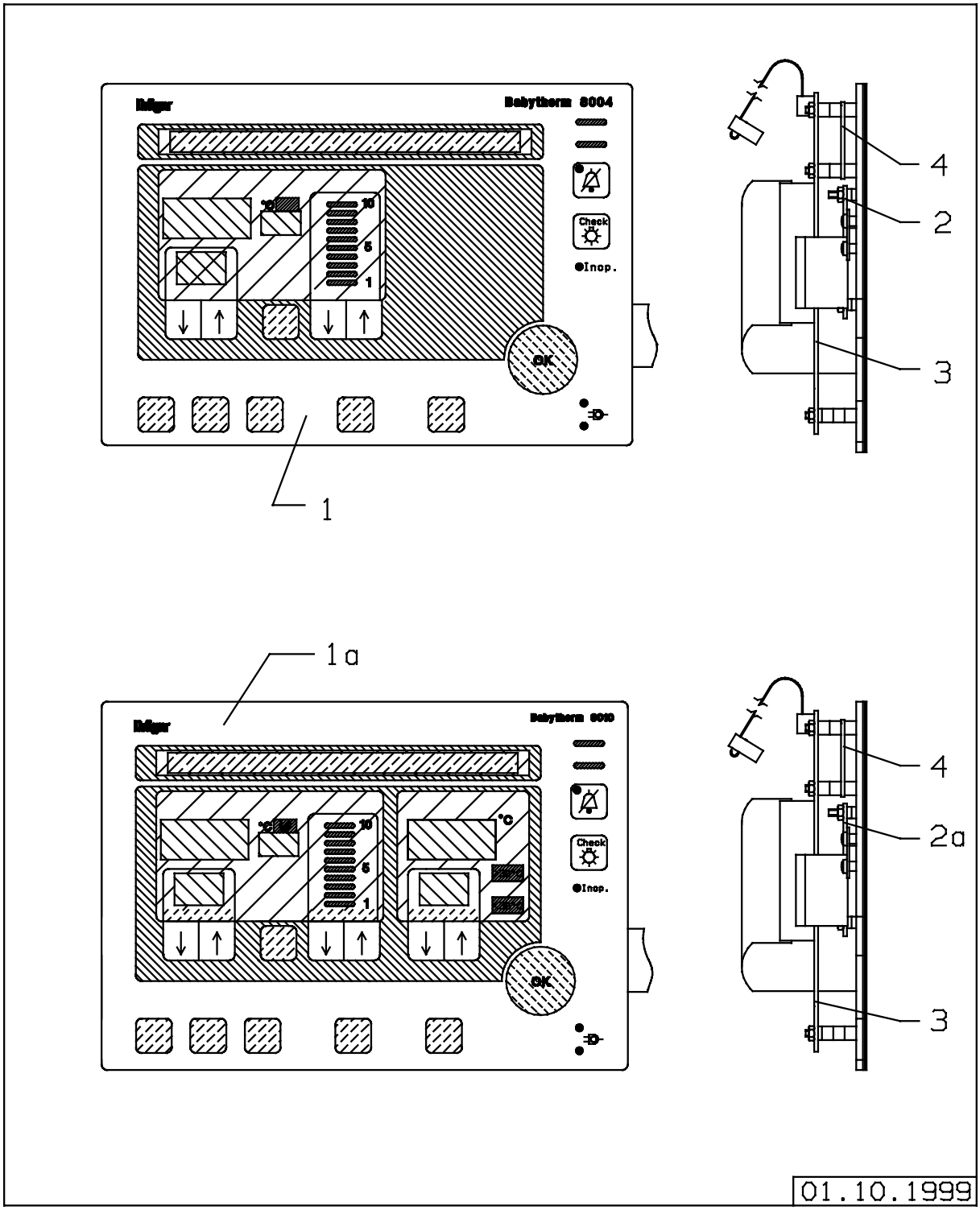
Bild/Picture 2



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1	BEST.LP WT-CONTROLLER OIC1 für Elektronik 8010 PCB WT CONTROLLER for electronic 8010		8290674	
2	BEST.LP WT-POWER PCB WT POWER		8290686	
3	KABELBAUM SCHALTER CABLE HARNESS, SWITCH		2M30143	
4	BEST.LP RELAIS PCB WT RELAY		8290701	
5	FRONT 8004,VOLLST. FRONT 8004,CPL.		2M30229	
5a	FRONT 8010,VOLLST. FRONT 8010,CPL.		2M30095	
6	SICHERUNGSEINS.DIN41662 T6,3A FUSE LINK DIN 41662 T6,3A		1815172	10
7	SICHERUNGSEINS.DIN41662 T3,15A FUSE LINK DIN 41662 T3,15A		1815148	10
8	SICHERUNGSEINS.DIN41662 T2A FUSE LINK DIN 41662 T2A		1815113	10
9	SICHERUNGSEINS.DIN 41662 T5A FUSE LINK DIN 41662 T5A		1815164	10
10	G-SCHMELZEINSATZ T1A DIN41662 FUSIBLE PLUG T 1 A DIN41662		1815083	10
11	SICHERUNGSEINS.T2,5A DIN41662 FUSE LINK T2,5A DIN41662		1815121	10
	SW OPEN CARE 1.01 OHNE ABBILDUNG SW OPEN CARE 1.01 WITHOUT ILLUSTRATION		2M30440	

FRONTPLATTE
FRONT PANEL

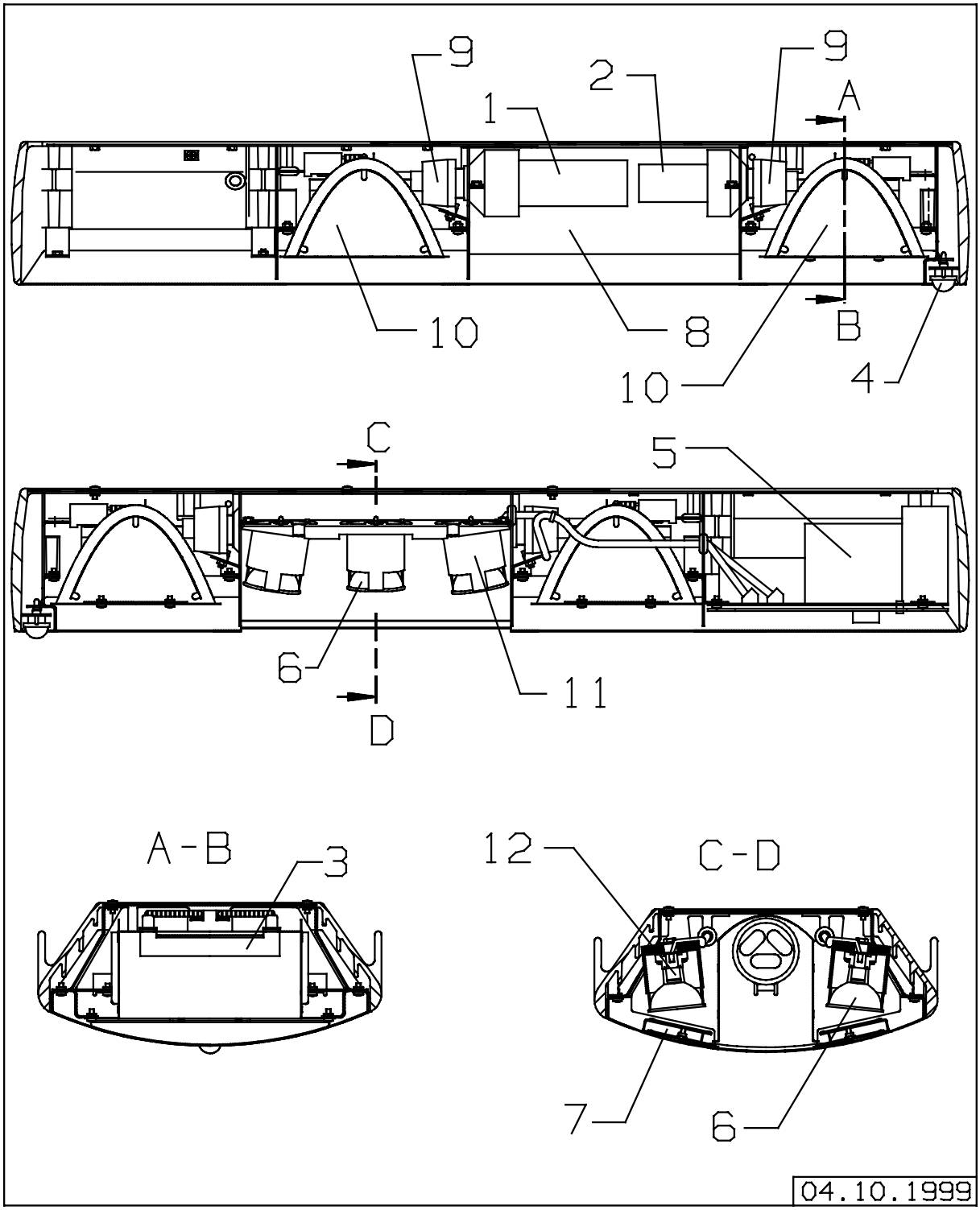
Bild/Picture 3



Position **Item No.**	**Benennung** **Description**	**Sach-Nr.** **Part No.**	**Bestell-Nr.** **Order-Code**	**Packung** **Quantity**
1	FOLIENTASTATUR 8004,VOLLST. KEY PAD 8004,CPL.		2M30020	
1a	FOLIENTASTATUR 8010, VOLLST. KEY PAD 8010, CPL.		2M30010	
2	BEST.LP WT-LED-8004 PCB WT-LED 8004		8290765	
2a	BEST.LP WT-LED-8010 PCB WT LED 8010		8290761	
3	BEST.LP WT-FRONT-COM PCB WT FRONT-COM		8290745	
4	TEXTDISPLAY TEXT DISPLAY, CPL.		2M30125	

STRAHLER
PROJECTOR

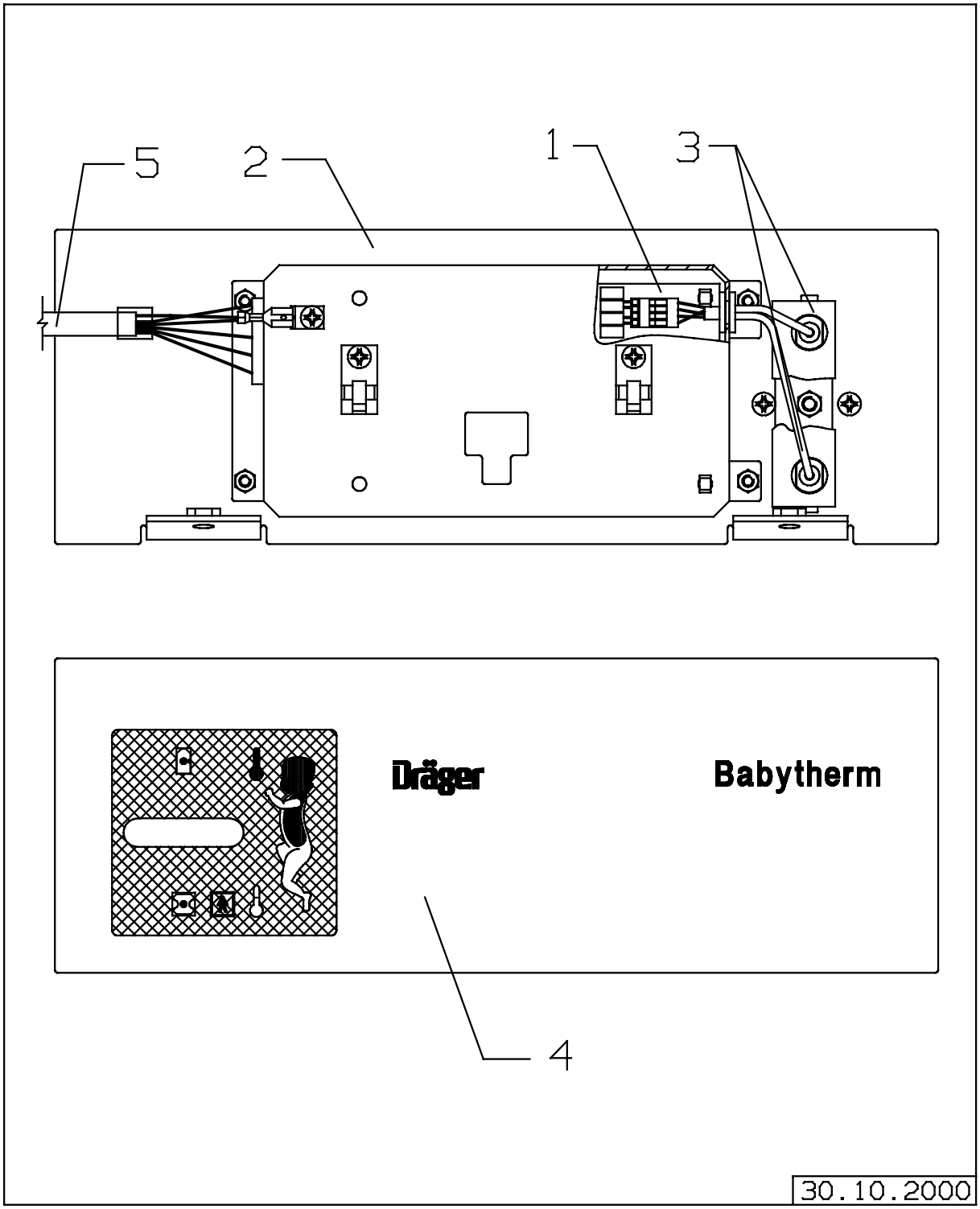
Bild/Picture 4



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-4	WAERMESTRAHLER 230V RADIANT HEATER 230V		2M30152	
1-4	WAERMESTRAHLER 110V RADIANT HEATER 110V		2M30153	
1	LAMPE 23W 230V INCANDESCENT LAMP 23W 230V		2M30079	
1	LAMPE 20W LAMP 23W/120V		2M30160	
2	LAMPE 7W 230V INCANDESCENT LAMP 7W 230V		2M30078	
2	LAMPE 9W/120V LAMP 9W/120V		2M30161	
3	INFRAROTSTAB 230V INFRARED RADIATOR 230V		2M30114	
3	INFRAROTSTAB 110V INFRARED RADIATOR 120V		2M30159	
4	BEST.LP ALARMLED (RH8000) PCB ALARM		8290721	
5	SPEZIFI.SCHALTNETZTEIL POWER PACK		2M21832	
6	HALOGENLAMPE 12V 50W HALOGEN LAMP 12V 50W		2M30084	
7	FILTER, KOMPL. FILTER, CPL.		2M30302	
8	REFLEKTOR TAGESBELEUCHTUNG REFLECTOR,DAYLIGHT		2M30212	
9	LAMPENFASSUNG E27 LAMPHOLDER E27		1843109	
10	REFLEKTOR INFRAROTSTRAHLER REFLEKTOR INFRARED RADIATOR		2M30213	
11	LAMPENHALTER LAMP HOLDER	2M30085		
12	FASSUNG 220 TF HOLDER 220 TF	2M30163		
	THERMOSCHALTER 120/105 LV02633 OHNE ABBILDUNG THERM SWITCH 120/105 LV02633 WITHOUT ILLUSTRATION	1843079		

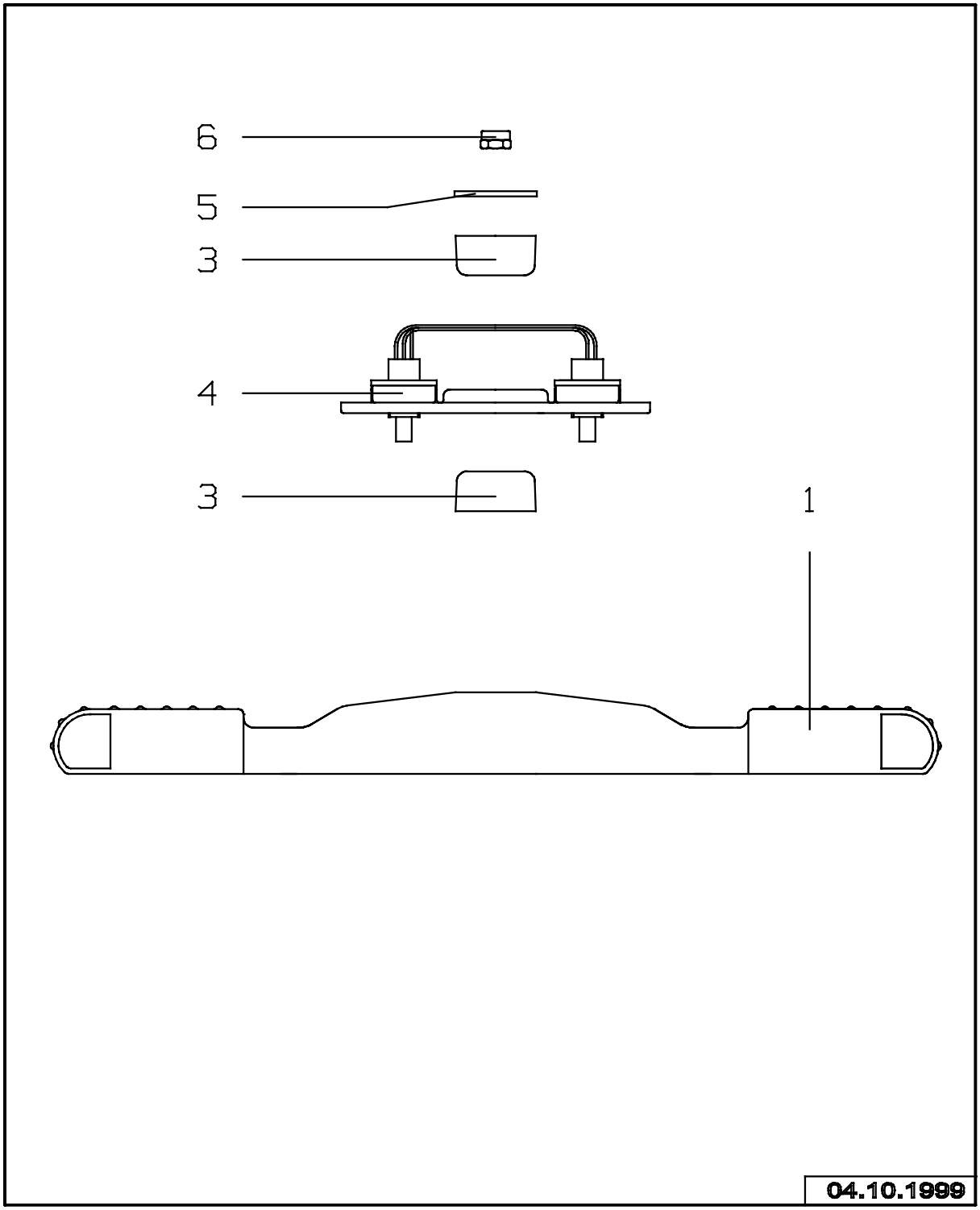
SENSOREINSCHUB
PLUG-IN UNIT FOR SENSOR

Bild/Picture 5



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1	BEST.LP WT-SENSOR 8004 PCB WT SENSOR 8004		8290731	
1	BEST.LP WT-SENSOR 8010 PCB WT-SENSOR 8010		8290735	
2	ABDECKPLATTE (Blindplatte) COVER PLATE (blind plate)	2M30291		
3	KB HAUTTEMPERATURSENSOR CABLE HARNESS SKIN TEMP.SENSOR		2M30308	
4	SCHILD LABLE (PLUG-IN UNIT FOR SENSOR	2M30276		
5	KABELBAUM SENSOR EXTERN CABLE HARNESS SENSOR EXTERN		2M30045	
	THERMOTRACE CORE (5ST) (GE) OHNE ABBILDUNG THERMOTRACE CORE (5PC) (Yel) WITHOUT ILLUSTRATION		MX11000	
	THERMOTRACE PERIPHERAL (5ST) (WS) OHNE ABBILDUNG THERMOTRACE PERIPHERAL (5PC) (WHITE) WITHOUT ILLUSTRATION		MX11001	

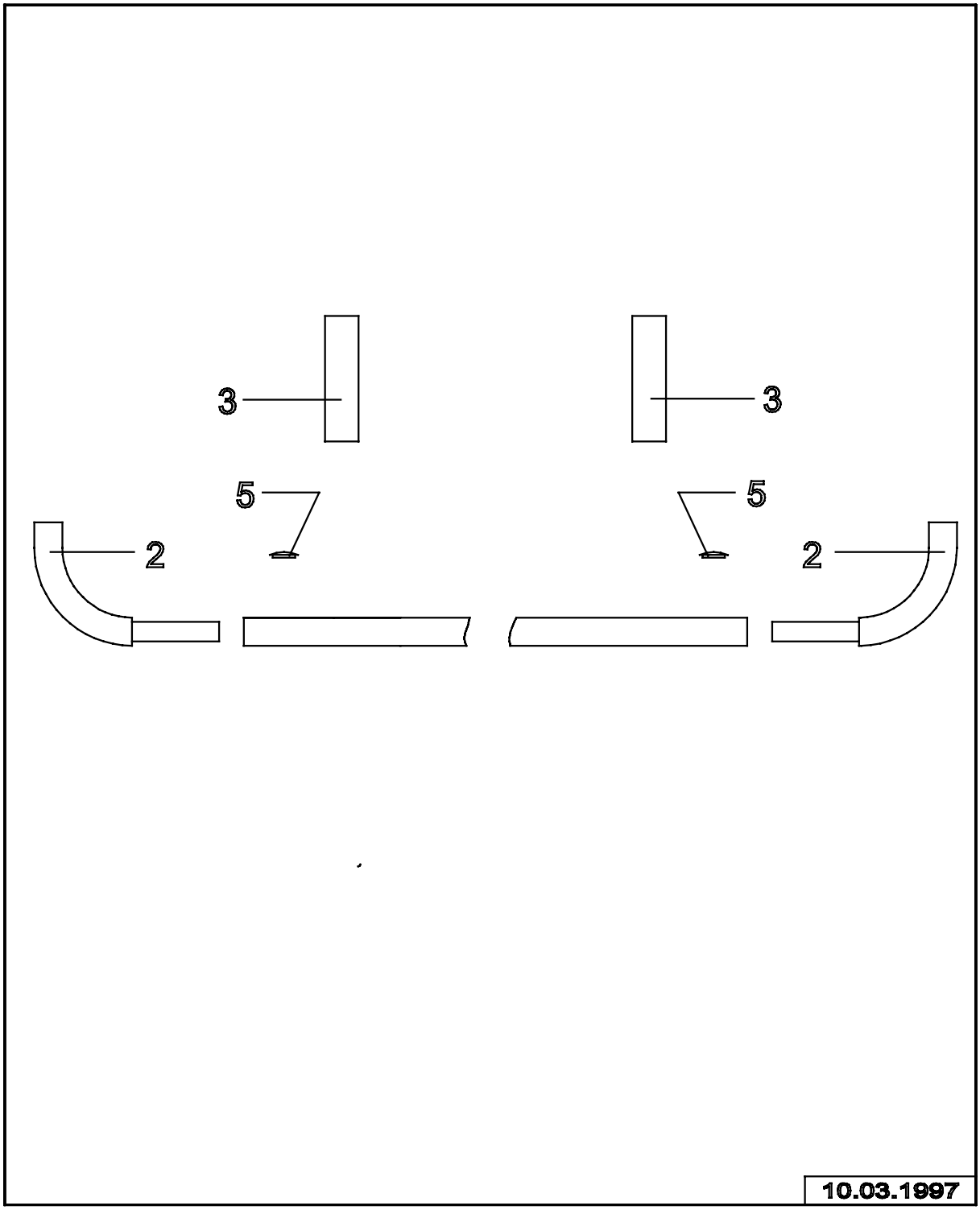
FUSSPEDALE, VOLLST. **Bild/Picture 6**
PEDAL, CPL.



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-6	FUSSPEDALE, VOLLST. PEDAL, CPL.		2M20290	
1	PEDALE PEDAL		2M20218	
3	RUNDPUFFER RUBBER BUFFER	M20685		
4	DRUCKSCHALTER 1POLIG MICROSWITCH SDRU 1POL TA/WE		1831666	
5	SCHEIBE WASHER	G80073		
6	SECHSKANTMUTTER M6 DIN985-A2 HEXAGON NUT M6 DIN 985-A2	1333062		50

GRIFFLEISTE
HANDLE

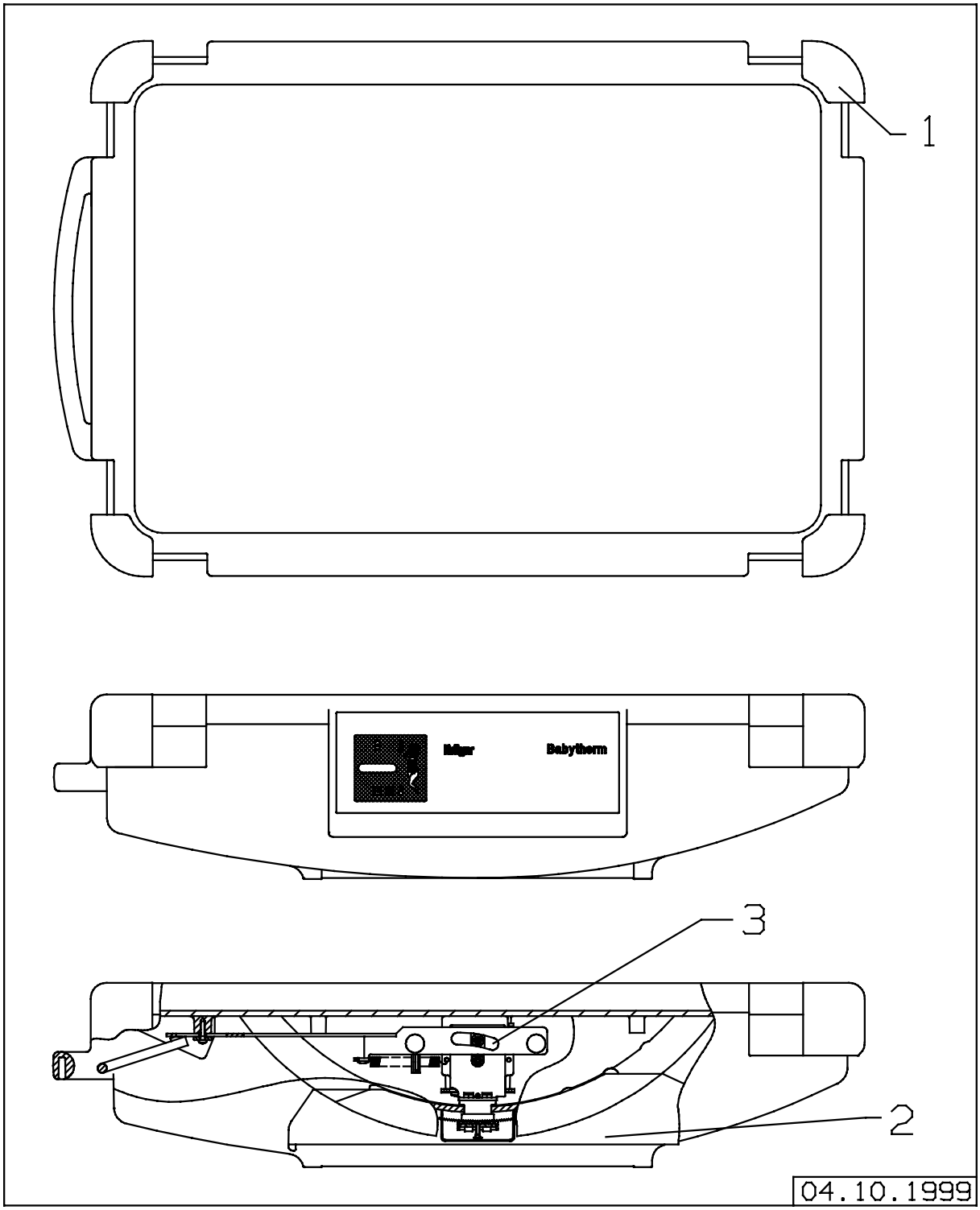
Bild/Picture 7



Position **Item No.**	**Benennung** **Description**	**Sach-Nr.** **Part No.**	**Bestell-Nr.** **Order-Code**	**Packung** **Quantity**
2- 3	GRIFFLEISTE,VOLLST. HANDLE		2M20862	
2, 5	GRIFFLEISTE, VOLLST. HANDLE,CPL. / BT.8000		2M21161	
2	ENDSTUECK END PIECE		2M20696	
3	ROHR TUBE		2M13388	
5	ABDECKKAPPE CAP	G13569		

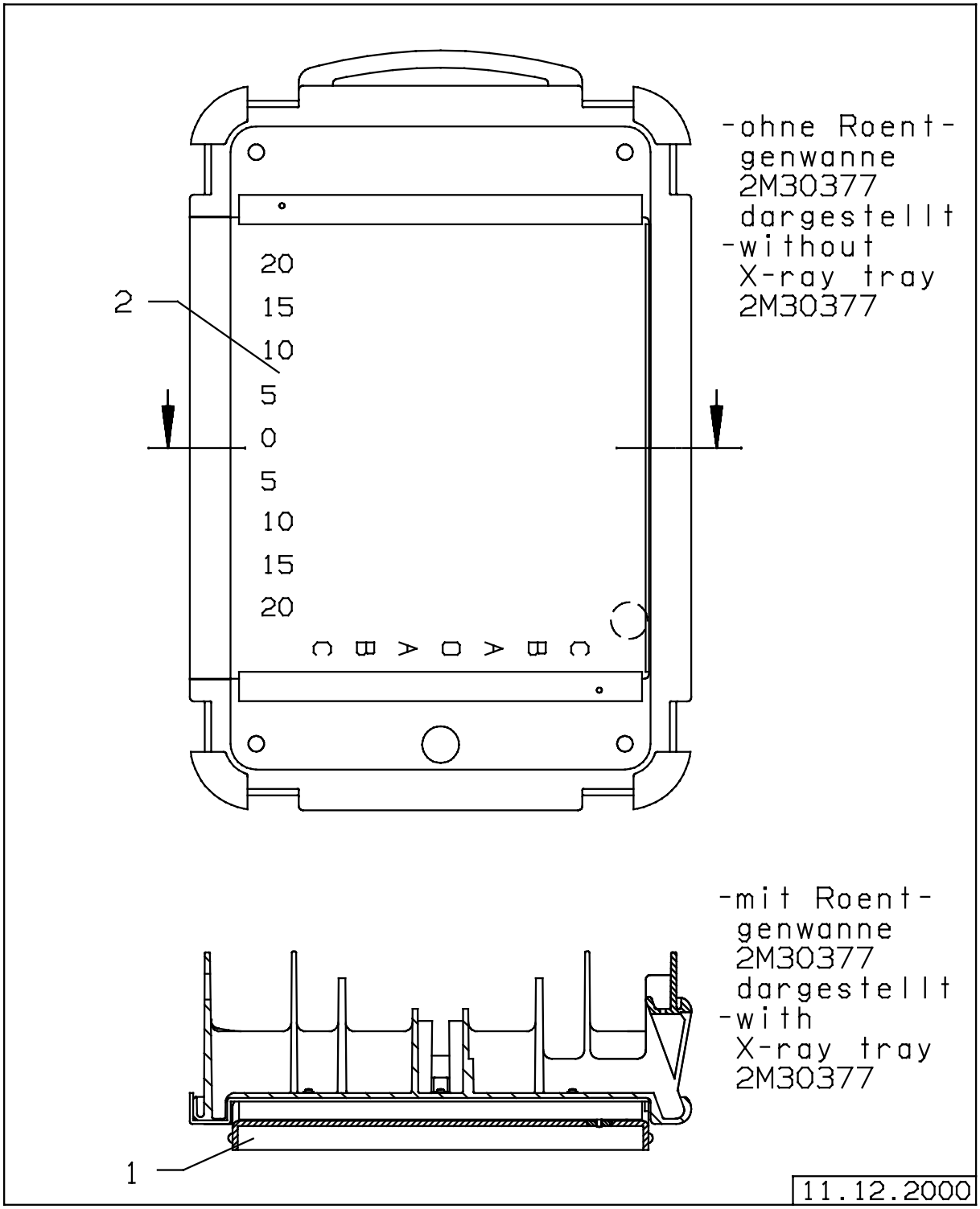
LIEGEBETTCHEN
COT

Bild/Picture 8



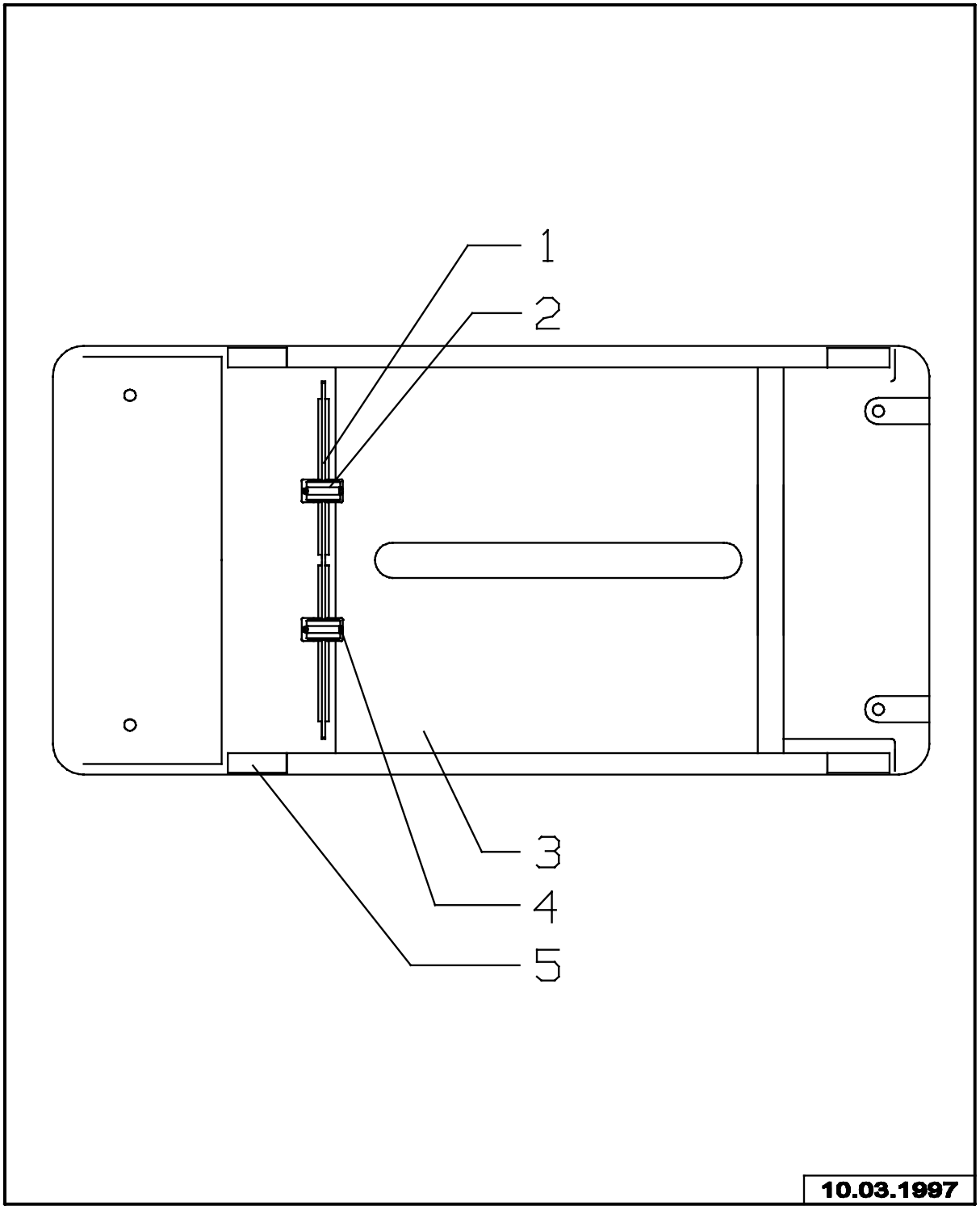
Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1-3	LIEGEBETTCHEN,VOLLST. COT		2M30263	
1	ECKE M. OF CORNER WITH SURFACE FINISH		2M21390	
2	SCHRAEGSTELLUNG, VOLLST. INCLINATION, CPL.	2M20854		
3	VERRIEGELUNG,VOLLST. LOCK, CPL.		2M20838	

BASSINET, COMPL. (X-RAY) **Bild/Picture 9**
BASSINET, COMPL. (X-RAY)



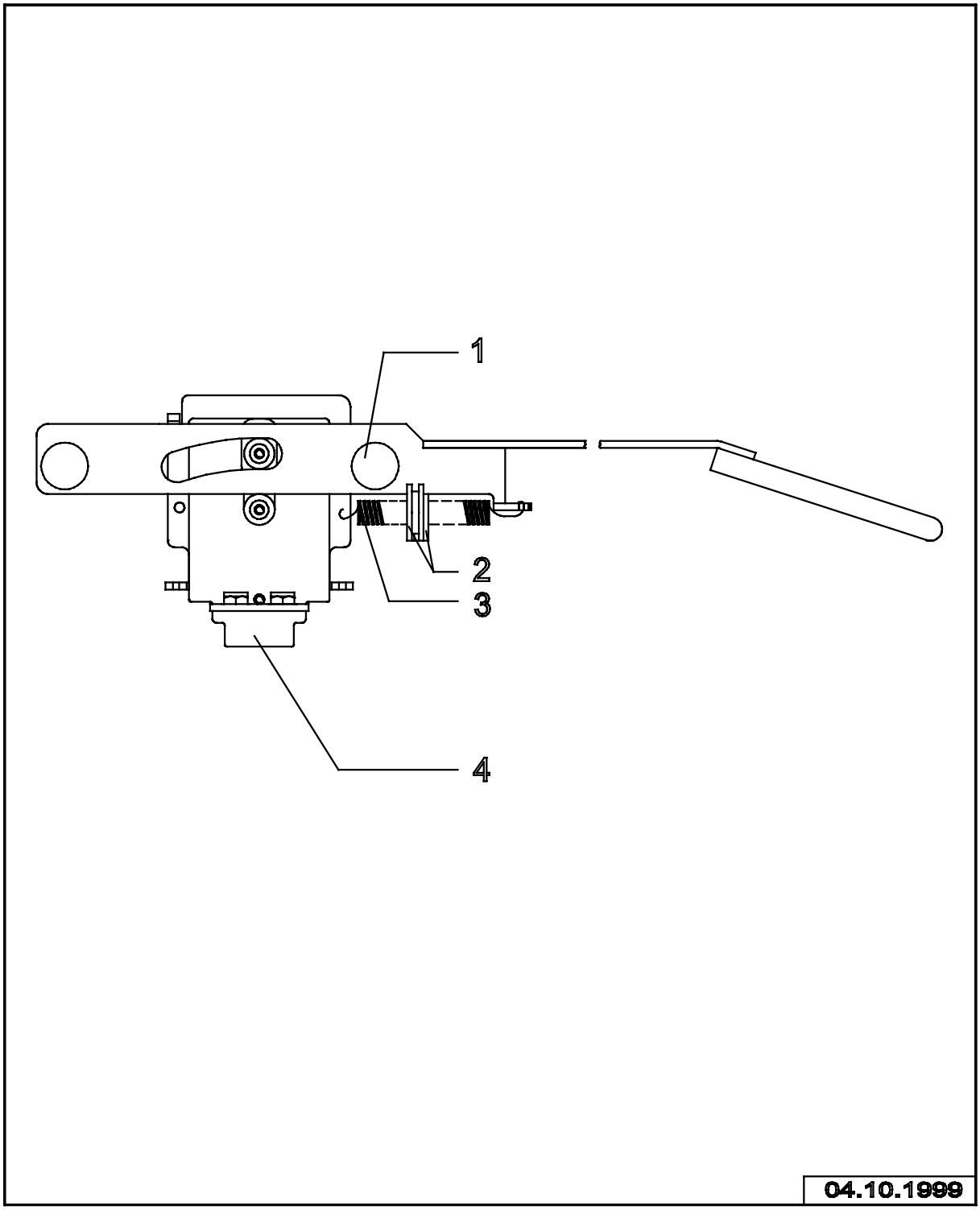
Position **Item No.**	**Benennung** **Description**	**Sach-Nr.** **Part No.**	**Bestell-Nr.** **Order-Code**	**Packung** **Quantity**
1	X-RAY TRAY X-RAY TRAY		2M30377	
2	X-RAY DRAWER X-RAY DRAWER		2M30382	

SCHRAEGSTELLUNG, VOLLST. **Bild/Picture 10**
INCLINATION, CPL.



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1 - 5	SCHRAEGSTELLUNG, VOLLST. INCLINATION, CPL.	2M20854		
1	FEDER SPRING	2M20897		
2	ROLLE ROLLER	2M20895		
3	SCHRAEGSTELLUNG INCLINATION	2M20821		
4	O-RING TOROIDAL SEALING RING		M12747	
5	PTFE-SELBSTKLEBEFOLIE SELF ADHESIVE FOIL PTFE	2M20916		

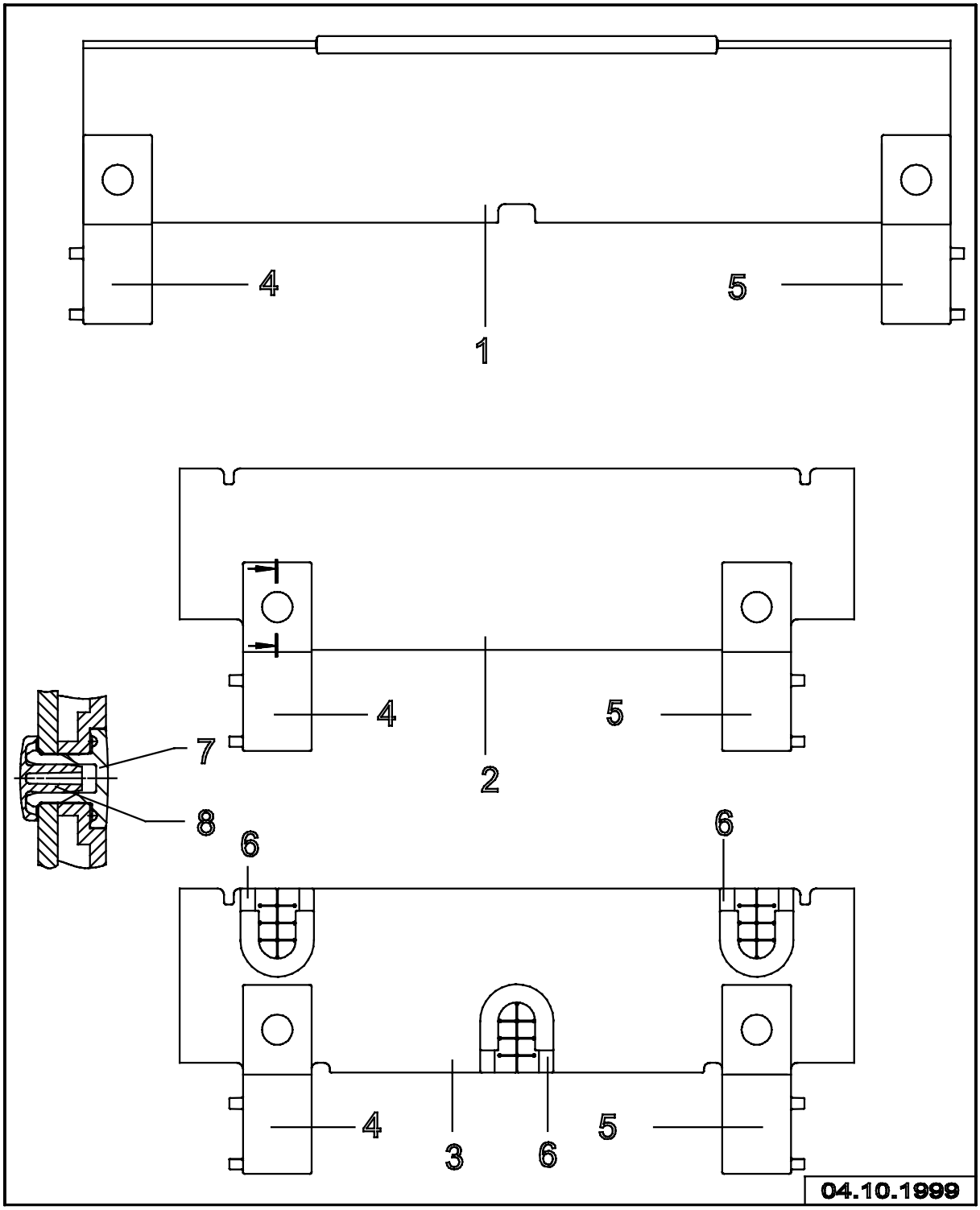
VERRIEGELUNG,VOLLST. **Bild/Picture 11**
LOCK, CPL.



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1 - 4	VERRIEGELUNG,VOLLST. LOCK, CPL.		2M20838	
1	ANSCHLAGPUFFER STOP BUFFER		2M13141	
2	KABELDURCHFUEHRUNG CABLE BUSHING	CH19989		
3	FEDER SPRING	8300445		
4	RASTE CATCH		2M20855	

SATZ SCHEIBEN,HOEHE 15 CM
SIDE WALLS,HEIGHT 15CM

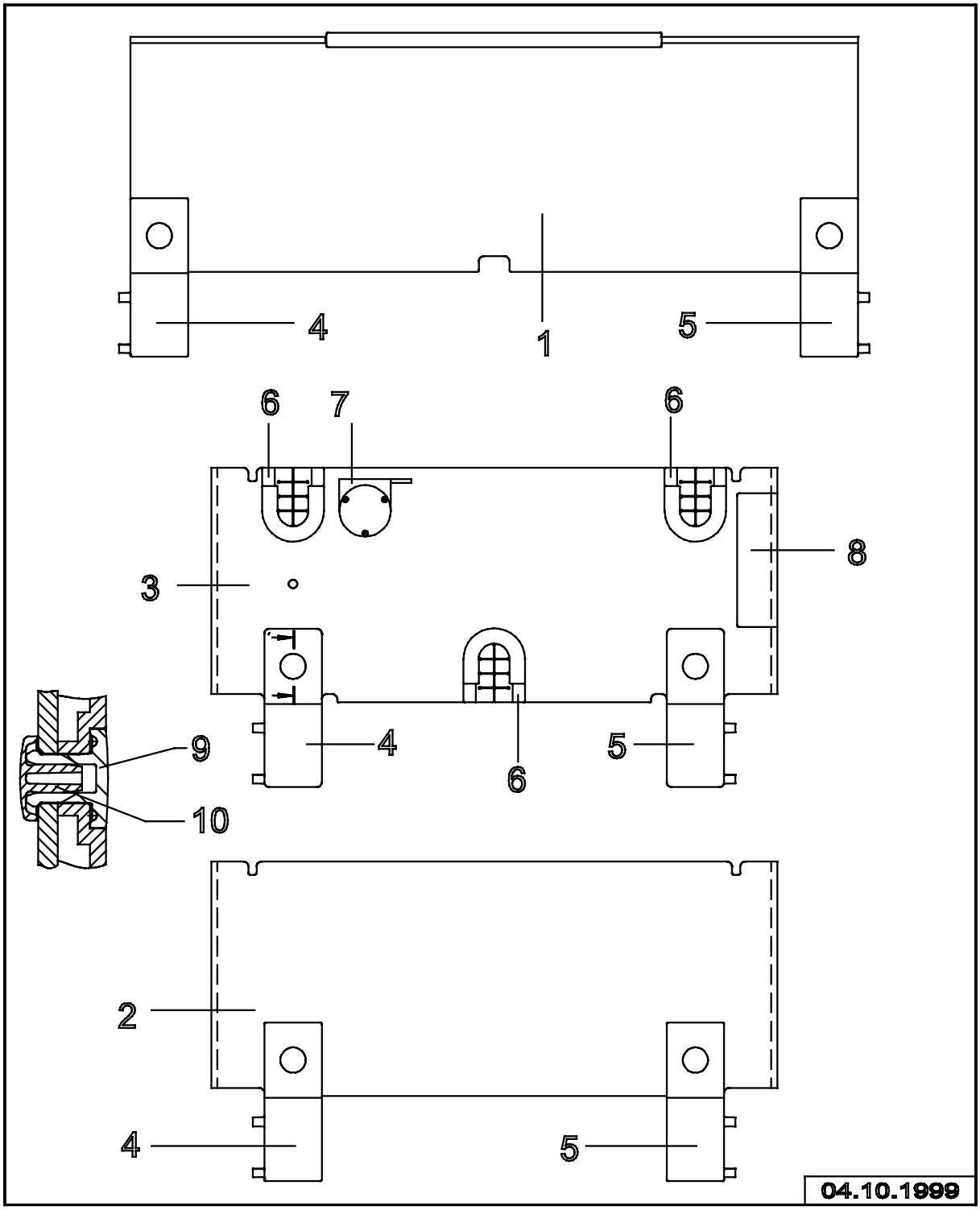
Bild/Picture 12



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1 - 6	SATZ SCHEIBEN (15 CM) SIDE WALLS,HEIGHT 15CM		2M21032	
1,2,6-8	SATZ SCHEIBEN 15CM,WEISS SIDE WALLS,HEIGHT 15CM WHITE		2M30242	
1	SEITENSCHEIBE (15 CM) HELL ORANGE SIDE PANE (15 CM) PALE ORANGE		2M20886	
1	SEITENSCHEIBE (15CM) WEISZ RÖNTGENSKALIERUNG SIDE PANE (15CM) WHITE RÖNTGEN SCALE	2M30241		
2	STIRNSCHEIBE, VORN (15CM) FRONT PANE (15CM)		2M20891	
2	STIRNSCHEIBE (15CM) VORNE MIT 4 DURCHFÜHRUNGEN RÖNTGENSKALIERUNG FRONT PANE (15CM) FRONT WITH 4 IMPLEMENTATION RÖNTGEN SCALE	2M30239		
3	STIRNSCHEIBE HINTEN (15CM) REAR PANE (15 CM) BACK (15CM)		2M20892	
4	E-SET SCHARNIER,RECHTS REP.SET HINGE, RIGHT		2M21082	
5	E-SET SCHARNIER, LINKS REP.SET HINGE, LEFT		2M21084	
6	SCHLAUCHDURCHFUEHRUNG TUBE BUSHING		2M20434	
7	SCHNAPPER grau / weiß SPRING-LOADED CATCH grey / white		2M30210	
7	SCHNAPPER hell orange SPRING LOADED CATCH light orange		2M20898	
8	KNOPF grau / weiß BUTTON grey / white		2M30211	

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
8	KNOPF hell orange BUTTON light orange		2M20899	

SATZ SCHEIBEN,HOEHE 23 CM **Bild/Picture 13**
SIDE WALLS,HEIGHT 23CM

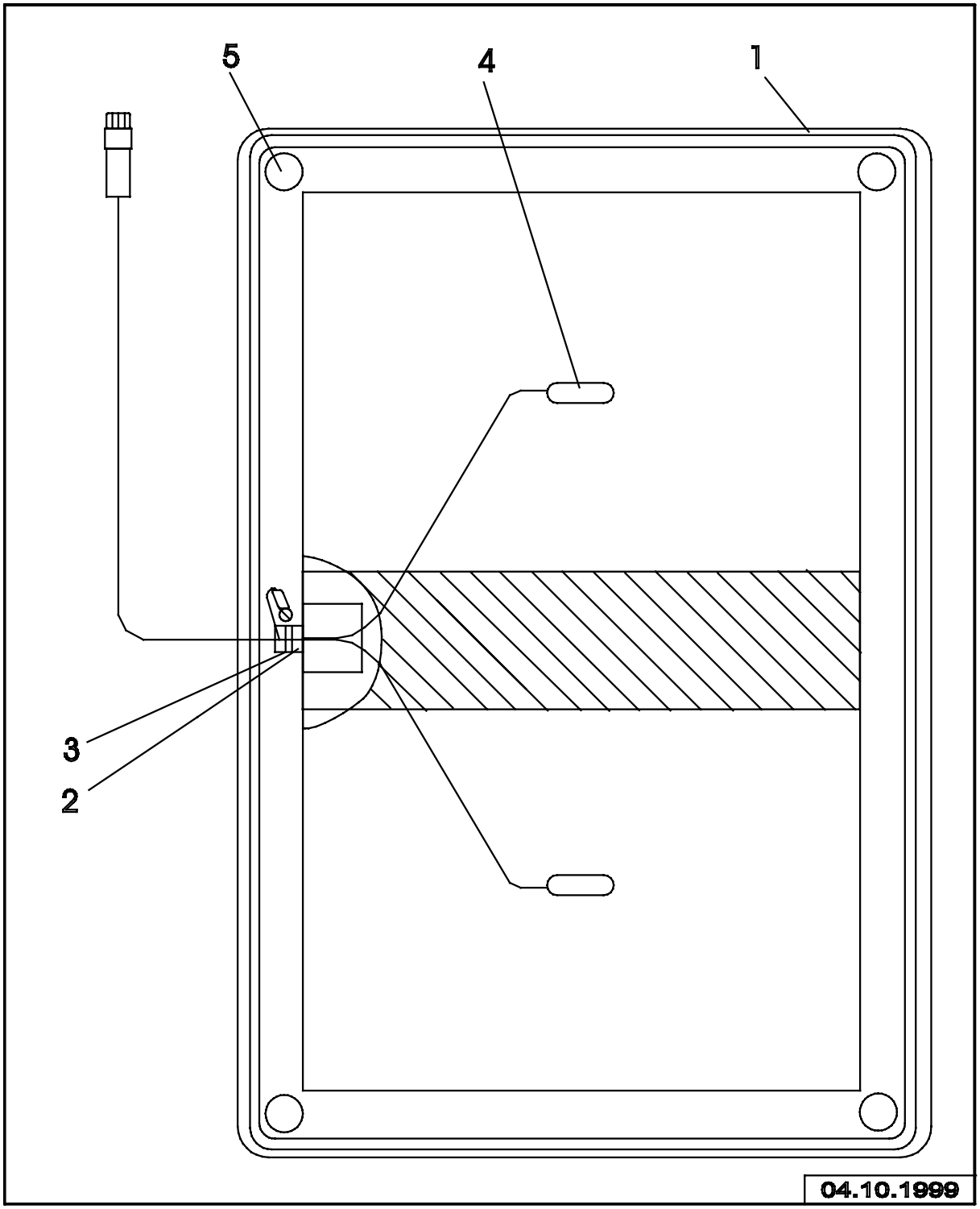


Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1 - 8	SATZ SCHEIBEN,HOEHE 23CM SIDE WALLS,HEIGHT 23CM		2M21034	
1-3, 6-10	SATZ SCHEIBEN 23CM,WEISS SIDE WALLS,HIGH 23CM,WHITE		2M30301	
1	SEITENSCHEIBE (23CM) HELL ORANGE SIDE PANE (23 CM) PALE ORANGE		2M20931	
1	SEITENSCHEIBE 23CM (GRAUWEISZ) GRAU/ WEISZ SIDE PANE (23CM) GREY/ WHITE	2M30297		
2	STIRNSCHEIBE VORN (23 CM) HELL ORANGE FRONT PANE (23 CM) PALE ORANGE		2M20932	
2	STIRNSCHEIBE VORNE 23CM GRAU/ WEISZ FRONT PANE (23CM) GEY/ WHITE	2M30295		
3	STIRNSCHEIBE HINTEN (23 CM) MIT 3 ÖFFNUNGEN, HELL ORANGE REAR PANE (23 CM) WITH 3 OPENINGS, PALE ORANGE		2M20937	
3	STIRNSCHEIBE HINTEN 23CM MIT 3 DURCHFÜHRUNGEN, GRAU/ WEISZ REAR PANE (23CM) WITH 3 IMPLEMENTATIONS, GREY/ WHITE	2M30296		
4	E-SET SCHARNIER,RECHTS REP.SET HINGE, RIGHT		2M21082	
5	E-SET SCHARNIER, LINKS REP.SET HINGE, LEFT		2M21084	
6	SCHLAUCHDURCHFUEHRUNG TUBE BUSHING		2M20434	
7	VERSCHLUSS LOCK		2M13042	
8	SCHILD LABEL	2M21147		
9	SCHNAPPER grau / weiß SPRING-LOADED CATCH grey / white		2M30210	

Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
9	SCHNAPPER hell orange SPRING LOADED CATCH light orange		2M20898	
10	KNOPF grau / weiß BUTTON grey / white		2M30211	
10	KNOPF hell orange BUTTON light orange		2M20899	

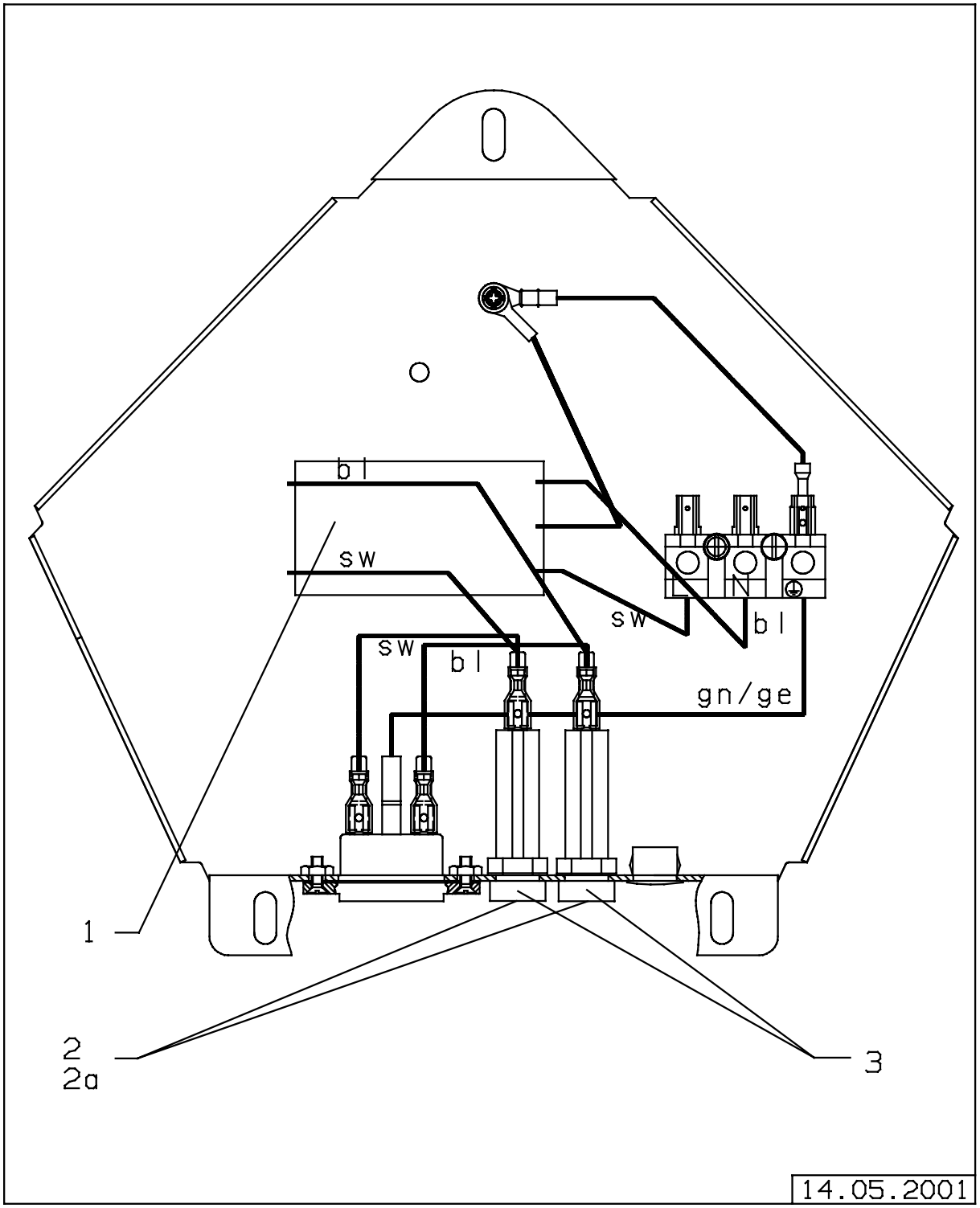
HEIZPLATTE,VOLLST.
HOT PLATE, CPL.

Bild/Picture 14



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1 - 5	HEIZPLATTE,VOLLST. HOT PLATE, CPL.		2M21510	
1	PROFIL-DICHTUNG PROFILE PACKING		2M21423	
2	KREUZHALTERUNG,SELBSTKLEBEND CROSS SUPPORT, SELF-ADHESIVE	G13085		
3	KABELBINDER CABLE CLIP (2,4X92)		8712007	
4	2-FACH TEMPERATURSENSOR TEMPERATURE DETECTOR,2-FOLD		2M20859	
5	DISTANZSTUECK SPACER	2M21552		

NETZ BASISPLATTE **Bild/Picture 15**
BASIC PLATE FOR NET



Position Item No.	Benennung Description	Sach-Nr. Part No.	Bestell-Nr. Order-Code	Packung Quantity
1	NETZFILTER	2M30395		
2	F M15H 250V 6,3X32 LV02640 100V/ 120V F M15H 250V 6,3X32 LV02640 100V/ 120V	1843141		
2a	SICHERUNGSEINS. M10H 6,3X32 240V FUSE LINK 240V		1843168	
3	SICHERUNGSHALTER MIT KAPPE UL FUSE HOLDER		1840983	
	NETZ-ANSCHLUZKABEL 230V (OHNE ABBILDUNG) POWER CABLE 230V (WITHOUT ILLUSTRATION)		2M30247	

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Subject to modification.
Will not be replaced in the event of modifications.